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Important Health Problems Experienced in the Army Missile Programs*

By

COLONEL JOHN R. HALL, JR., MC, USA†

GENERAL HALL, Fellow Panelists, Ladies and Gentlemen, it is an honor to come from academic consideration of the elements of national power to discuss briefly with you some of the very concrete problems and experiences we have had in the U. S. Army missile program. I lived intimately with these for the past 3 years, and have been intrigued with them for much longer.

Let me take you back to 1946 and the Great Southwest. A Lieutenant Colonel Harold Turner, representing a far-sighted U. S. Army Ordnance Corps, marshalled a group of German missile scientists at the wartime station hospital at Fort Bliss and pioneered a proving range for their V-2's to the north of El Paso. This has become the famous White Sands Proving Ground. The leader of the German group was even then a marked and distinguished man, Werner von Braun. Then, as now, he was always reverently referred to by his associates as "The Professor."

Just home from X Corps at Hiroshima and the follow-up on the atomic bomb, I was in Refresher Training in Surgery at William Beaumont Army Hospital. I was fortunate in serving with an even more curious, yes, downright inquisitive—young plastic surgeon, who is now one of our top men. When the word leaked, as it always did, that von Braun was to shoot on the morrow, we carefully and, I must admit, quietly rescheduled our work. After making rounds next day, we'd dash for El Paso International Airport, grab a private plane, and in a few minutes land on a road near the launching pad to watch, photograph and contemplate the mysteries and flight characteristics of the missile. Once the amazing height of 204 miles was achieved; once the missile took off horizontally at 200 feet in the general direction of Alamagordo, to be exploded by the safety officer. But always, before we flew back to Beaumont and accusations of hooky, we were impressed (and sometimes terrified) by the tremendous potential medical problems. The fuels, the oxidizers, the electronic gadgets, and most impressive, the possible results of combinations gave us food for thought for years to come.

Before updating to current problems, let me pay tribute to those missile men and the leaders who had the foresight to make their efforts possible. The ballistic missile was flown operationally against England in World War II. The gimballed thrust engine and the fundamentals of electronic programming and control were well-along by 1946. This tickled the imagination of Army Ord-

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† Student, National War College, Washington, D.C.

nance men, always ballistic conscious. Thus came the opportunities for, and the work of, von Braun and Army missile men. Thus came the Army missiles which are in operational use, as well as those in development. Thus came "Explorer."

By 1955, when I returned to serve General Hays as Chief of Occupational Medicine, the Army Missile Program was leading the world. Operational Nike missiles were on site throughout the length and breadth of the land. Firings were daily occurrences. Other missiles were in or were approaching operational state. Research missiles were far advanced. The reaching into outer space, ever a dream of von Braun and his far-sighted people, was just around the corner. The operating Nikeman was handling Red Fuming Nitric Acid (RFNR) as an oxidizer, certain grades of crude oil distillate—possibly fortified by some high grade oxidant such as hydrazine or its derivatives—as a fuel, and was exposed to excessive noise from his power generators, possible exposure to microwave energy from his acquisition and tracking radars, as well as the ordinary occupational exposures of men working in a highly industrialized military community. These included exposures to solvents, fire extinguishants, and potential fire extinguishants, common fuels, potentially toxic metals and other materials, and a multitude of those potential maimers and killers we now regard as commonplace. Let me say without reservation that these "commonplace" hazards still produce more morbidity and mortality than the exotic agents.

Under date of 21 June 1954 a tri-service technical bulletin, Army TB MED 242[1] had been published. Proponent agency was the Army. Applied and basic research was done by Army Environmental Health Laboratory and the Medical Laboratories of the Army Chemical Center. This bulletin was so comprehensive with regard to fuels, oxidizing agents, and combustion products that it stood until 26 February 1957, when the increased use of and data regarding unsymmetrical dimethyl hydrazine (UDMH) warranted Change 1.[2] This bulletin also stressed the essentials of a preventive program and the use of military protective masks. The entire philosophy was and is aimed at preventing occupational exposure and illness. There are other documents and works, but time precludes discussion.[3]

We have always been concerned less a missileman be engulfed in a cloud of, a more chronically exposed to, heavy oxides of nitrogen. These could be encountered in combustion products or in handling fuming nitric acid oxidants. Medical men learned long ago of acute and chronic exposures to the heavy oxides of nitrogen, particularly the tetroxides, from the classical silo fillers disease, described among agricultural workers.[4] We have followed carefully exposed individuals, but have not seen the clinical entity. Let me describe one. A Nike missileman near Washington was observed in a heavy cloud resulting from red fuming nitric acid (RFNA) spill. He inhaled, moved free of the cloud, and exhaled heavy red fumes.[5] He has been carefully followed. He has had no difficulties other than prompt conjunctival irritation followed by transitory respiratory difficulty (described as "breathing through a small hole") coupled with extreme dryness of the mouth and throat. All X-Ray and Laboratory findings have been negative.

With the introduction of unsymmetrical dimethylhydrazine (UDMH) as a fuel component, Dr. Burton Shook at Redstone Arsenal instituted close medical surveillance of potentially exposed persons.[6] Spillage has proved that pulmonary and gastrointestinal irritation do result from exposure to this agent. Shook found increasing numbers of Army UDMH handlers at Redstone, and later at Cape Canaveral, converted from negative to positive reactors to cephlin floculation tests. Controls among nonhandlers, observing and carrying out other functions in the same area, did not so convert. It is my understanding that the same observations were made among personnel of the other services at Cape Canaveral. Other laboratory and physical findings were negative.

In January 1958 a 29 year old white male chemist disregarded safety regulations and discarded some UDMH into a small lead laboratory sink. Two days later, while working alone, he discarded some concentrated hydrogen peroxide into the same sink. A terrific explosion occurred. The chemist was burned about the face and neck, apparently by both flame and peroxide. Fragments of the sink became projectiles, one entering each inguinal area. The one on the left nicked the adventitia of the great vessels. Another fragment ruptured a carboy of nitric acid, filling the room with fumes. Later, during decontamination, globular mercury was found in the lead drain from the sink, apparently from some long forgotten spillage. The chemist also had been working with tricresyl phosphate containing materials and with various chlorinated hydrocarbons. In addition, one year before he had been hospitalized for liver damage caused by alleged injudicious use of carbon tetrachloride.[7]

The patient was hospitalized in a civilian hospital under the care of an extremely competent Board certified surgeon. About two weeks after the injury the patient was not progressing satisfactorily. Dr. Shook was called in on the assumption that the chemist might have suffered occupational exposure with systemic response. He was, in fact one of those who had developed a positive cephalin flocculation test. Within a few days the patient developed pulmonary edema and expired.

Autopsy revealed, among other findings, acute severe myocarditis of the left ventricle and interventricular septum, mild portal cirrhosis, severe pulmonary edema, and effusions in the pericardial, pleural, and abdominal cavities. Autopsy material is still under study in several institutions, as you can well imagine.

Frankly, after spending a couple of days in hard "shoe leather" epidemology at Redstone, I think the picture is too confused to draw any clear-cut conclusions. I recount this to give you food for contemplation.

In summary, we have had our problems. We freely pass on our material to all having interest and enjoy close cooperation with the other services and with civilian consultants and researchers. I think our preventive occupational medicine programs have paid off. I am less concerned with transitory exposures to the oxides of nitrogen than I was at one time. I think we have about as good control and study of hydrazine derivative exposures as can be done within the limits of practicality. We must continue to study that problem. As I review simple inorganic chemistry with regard to violent oxidants and oxidizers, coupled with newspaper announcements of coming fuels and oxidizers, I can see in my mind's eye that we are just now on the threshold of greater problems by several orders of magnitude. I have briefly and sketchily told you of our detected problems and have been required by the pressures of time to give no details of highly successful preventive programs. Suffice it to say that we have come a great way without significant operational exposure or demonstrated occupational disease among Army missile men due to exotic missile materials. Practically, our more commonplace occupational hazards continue to be our greatest, if not our most interesting, problems.

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PRESIDING at the Panel Meeting—"Occupational Health Problems in Space Flight" (pages 707-724) was Major General Wilford F. Hall, USAF, MC., Surgeon, Air Materiel Command, Wright-Patterson Air Force Base, Ohio.

—EDITOR

Occupational Health Problems in Space Flight as Experienced with Nuclear Power Plants*

By

LIEUTENANT COMMANDER JOHN H. EBERSOLE, MC, *U. S. Navy*†

(With three illustrations)

INTRODUCTION

IF WE DEFINE a space ship as a tubular craft capable of operating with a three dimensional capability, having a propulsion system independent of the earth's atmosphere, and existing in a medium inherently hostile to human life, we formulate a concept familiar to all of us. To continue by adding that the humans aboard this craft are its weakest link and that they survive in a microcosm separate from their normal physical and cultural environment is simply further qualifying a concept acceptable to all who have read Jules Verne, scanned the Sunday comics, or watched the TV screen. No stretch of the imagination is required to visualize such a ship in this era when the improbable exists today and the impossible is attained in the next 24 hours. Yet, even so, most of us visualize it as, at least, being in the near future.

It is surprising, therefore, that, by this definition, we have today at this moment at least five such craft in existence; that they are not only fully operational, but capable of combat missions; that together they have travelled nearly a quarter of a million miles without a single serious casualty, either human or material. To be sure, their three dimensional medium is the inner space of the world's oceans rather than the outer space of the stars, yet space ships they are. The nuclear submarine, although somewhat prosaically earthbound by the outer spaceman's standards, provides a potent similarity to many aspects of space travel, particularly from the medical viewpoint. Let us examine some of these points of similarity between outer and inner space ships.

SIMILARITY OF PROBLEMS

A general summary of the broad medical problems of the nuclear submarine may be presented within five areas. These are:

1. Nuclear radiation control
2. Atmospheric control in long submergence
3. Induced physiological changes peculiar to artificial environmental conditions
4. Personnel selection
5. Escape problems

These five broad areas show little discrepancy in comparison with the problems of outer space. For example, the information obtained from the Explorer satellite, and further elaborated by the moon shot, indicates that radiation of cosmic origin may be a problem of extreme importance in transiting outer space; moreover, a possible propulsion system for the outer space craft envisions the use of nuclear reactor. Certainly, then, radiation hazard or potential hazard is common to both vehicles.

In the area of environmental control a marked similarity exists. The submariner in a pre-nuclear submarine was rarely out of contact with the earth's atmosphere, for his ship had to surface frequently to charge batteries by air-dependent Diesel driven generators. This atmospheric dependence provided for a reasonably good change of air when surfaced and, as a result, neither his toxic metab-

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† Medical Officer, USS *Seawolf*. Recipient of the 1958 Gorgas Medal for outstanding contributions to preventive medicine for the Armed Forces.

Present address: U. S. Naval Hospital, National Naval Medical Center, Bethesda, Maryland.

olites nor those of his ship reached significant concentrations or provided for long exposures. How different is the lot of his nuclear confrere; the anerobic nuclear propulsion system, combined with adequate CO_2 removal and oxygen supply, allows the submariner to remain encased in his steel envelope for months away from the diluting and dispersing effect of an air change. Now toxic materials, even though released at a Lilliputian rate, may reach significant proportions unless their removal is accomplished or their release prevented in the first place. Most surprising of all, substances previously regarded as nontoxic and routinely used on board without apprehension become now dangerous and even limiting factors in the new parameters of long submergence. This includes such routinely used items as paint, solvent cleaners, cooking oils, cigarettes, ordinary refrigerant gases, and many others. We will elaborate some of these factors later, but for the present think of the prenuclear submarine as resembling the propeller driven low-altitude aircraft where encasement in the winged capsule was of relatively short duration and where external ventilation might easily be applied in an emergency. In transitional stages up through high altitude pressurized cabins, the aviator has approached and ultimately must meet the microcosmic environment of the nuclear submarine when he ventures into space. Here, more than in any other area, do the medical environmental problems of the submariner and spaceman meet on the common ground of a sealed chamber.

Apart from toxic inhalants appearing within the atmosphere of the sealed space there are other factors which may cause changes from slight to profound in the physiology of the organism. First of all, there is the relative absence of stimuli such as light and darkness, temperature and humidity changes, noise level changes, and other cyclic recurrent stimuli present in our normal earth-bound day-night environment. There is a partial abolition of these in the submerged submarine; this may be even more pronounced in the space ship. Lack of normal exercise, markedly obvious in the submariner who may eat, sleep, bathe, recreate, and work within a distance of 20-30 feet, will plague the spaceman, and may have far-reaching general metabolic and cardio-vascular effects. This may have further application for the spaceman whose lack of exercise is compounded by the gravity free state. Special sensory problems, other than those imposed by the gravity free state, such as effect of visual fixing constantly on near objects, effect of noise or lack of it require investigation in both applications. Thermodynamically, heat imbalance problems exist in both cases, but in opposite directions—the submariner attempts to heat up the ocean, the spaceman cannot lose heat from his craft by conduction or convection to a non-existent atmosphere. Both problems require engineering and physiological study and interpretation to provide optimum conditions.

Personnel selection is of paramount importance in both fields; indeed, the present safety record in submarines, nuclear and otherwise, is to a large extent a function of selection of personnel intellectually and emotionally. Good motivation, a capability to receive advanced technical training, a mechanical bent, and emotional maturity are all essential. Performance of the mission requires ruling out the grandstand player, the psychopath, the immature, the excitable, the lone wolf. The crewman must not only satisfy the requirements of his technical job, he must fit in the group with whom he will live in intimate contact 24 hours a day, day after day, during his mission. Physical selection is equally important, although standards must be flexible and realistically adapted to the environment and the job, i.e., the visual acuity standards of the lookout are not those of the radar operator.

Finally, escape is a problem to both the outer and the "inner spaceman." Here, in both cases, the man must not only free himself from his damaged vehicle before ultimate catastrophe occurs, but must then be prepared to cope with an exceedingly hostile environment after successful separation from

the vehicle. Oxygen supply, preservation of body heat, communications, mobility, and ultimate rescue problems are common to both. Neither problem is adequately solved at the moment—submarine escape from deep depths in icy cold water with a possible hostile enemy on the surface is an academic problem to the submariner. This is made even more so by the fact that he may be in the escape situation beneath the polar ice cap. This is a not unlikely situation in view of the recent voyages of the NAUTILUS and SKATE. Technological breakthroughs are required in both cases to bring the problem to an effective operational solution applicable to the more common types of casualties. Perhaps no final solution exists to guarantee ultimate survival in either case, but realistic compromises must be reached only after searching study of the escape situation in all its aspects. The psychological advantages of even limited escape probability must not be overlooked.

Dissimilarities

It is not accurate to describe the outer and inner space milieu as exactly alike, for some marked differences do exist. The spaceman, for example, must face the problem of high positive and negative forces during acceleration and deceleration. He must also learn to exist in the gravity free state with all its manifold problems. At least in the early phases, with the limited thrusts now available, he cannot use the bulky and heavy equipment of the submariner for air revitalization. Those of us who have seen the diminishing volume of even nuclear submarines, however, may not feel this discrepancy is too great. Certainly the efficient but heavy power plant shielding allowed the nuclear submarines in order to minimize radiation exposure almost to insignificance will not be available to the spaceman.

The submariner, on the other hand, has a greater lack of communications with the land mass when submerged than the spaceman who may utilize both radio and television modes for communications.

Although dissimilarities exist, the basic relationship is not greatly disturbed. The common problems of Submarine and Space Medicine may be further linked under the broader medical discipline of Occupational Medicine. Certainly, in both, men live in the ultimate case of intimate contact with their occupation, all functions of life occurring in the closest contact with the machinery which they serve.

The Problems of the Sealed Hull

Normal existence in the sealed hull of a submarine or in the space cabin demands three conditions.

1. A continuous oxygen supply.
2. Continuous removal of human metabolites.
3. Thorough study of all materials and techniques used to prevent buildup of toxic products of machinery origin.

These conditions may be bound up in the unified concept that the combined metabolism of the sealed cabin, its machinery, and its occupants must be considered a single entity in studying the environment.

Simple as this concept appears, it requires constant re-emphasis in relation to specific substances because the new time of exposure parameters may result in injurious effects from materials considered routinely safe in the past. Certainly, constant vigilance is necessary to prevent introduction of any new materials which may present atmospheric contamination problems. It is in this area, as mentioned previously, that the submariner has the most to offer the space man—his experiences with prolonged exposure in the completely sealed cabin that is a nuclear submarine.

The submariner's experience with the sealed cabin is illustrated by showing the increase in total submergence capability from 1955 to the present (Fig. 1). The total submergence concept, with complete independence from the earth's atmosphere, became a reality in 1955 when NAUTILUS remained completely submerged for 94 hours. Note the rapid improvement in capability to a 60 day

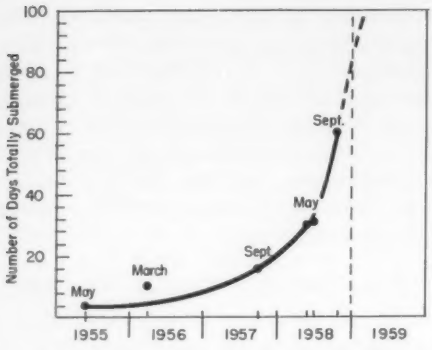

Fig. 1. Shows increase in total submergence capability, 1955-1959.

record dive by SEAWOLF during this current year. Concurrently, better atmospheric conditions have been developed. There has been a steady decrease in average CO_2 levels during the long dives made over this period, thereby indicating a corresponding increase in atmospheric control capability.

Let us examine some of the conditions of medical interest that arise in the sealed inhabitated cabin and which are applicable to the space craft both in principle and in specificity.

First of all, we have mentioned control of carbon dioxide which in the submarine has been achieved by a regenerating chemical scrubbing system. This is a classic example of the possibility of jumping from a frying pan into the fire for the ethanolamine used in the CO_2 scrubber is volatile, toxic, and may easily decompose to irritant ammonia. Here we introduce a new substance to solve an old problem, and thereby create a new set of problems requiring detection and measurement, knowledge of specific toxicology, and, as a solution, the maintenance of rigidly leak-tight systems.

This emphasis on maintaining rigid leak-tightness was met again in facing a hazard developing from a substance used for years in submarines and considered relatively harmless—the gas Freon used in air-conditioning units. This halogenated hydrocarbon, dichloro-difluoro methane, had been considered relatively non-toxic. Moreover, the relatively short dives of the pre-nuclear period could not produce high ambient concentrations. As a result neither leak-tightness nor possible effects of Freon decomposition products were particularly noted. The possible decomposition products include fluorine, chlorine, hydrofluoric acid, hydrochloric acid, and phosgene. Here is an excellent example of how an "old reliable" considered safe from long use may cause trouble in new situations.

In 1957 in SEAWOLF during a prolonged dive, after some repair work on an air conditioning unit, a sharp acrid odor was noted near any hot object, and burning of the eyes, nose, and lips noted in such an area. Near an open flame rapid corrosion of heavy stainless steel piping was noted; several men complained of corrosion of the chrome plate on their cigarette lighters. Smokers additionally complained of an acid or chemical taste in tobacco smoke. Heated nichrome wires exposed in this atmosphere quickly deteriorated; copper and brass objects showed marked surface corrosion; a single match lit above a breaker of silver nitrate solution produced in the solution a heavy halide surface precipitate. The estimated Freon concentration was 3% by volume with chemical decomposition rapidly occurring near any high temperature source. Fortunately, phosgene itself was undetected during this period. Needless to say both human and materiel effects were marked at this concentration. It was recognized that the solution rested on rigid leak-tightness of systems to prevent even small amounts of leakage as the 8 hour tolerance for HFL is only 3 ppm, even though Freon itself has a similar tolerance of 2000 ppm.

Not all toxic substances originate from machinery. Cigarette smoking produces toxic levels of carbon monoxide in excess of 100 ppm within 36 hours. Carbon monoxide burners must be used to catalytically oxidize CO to CO_2 for removal by the CO_2 scrubbing system. Interrelation between atmospheric conditions is illustrated by the fact that the hot

carbon monoxide burners become, in turn, excellent sources of hydrochloric and hydrofluoric acid if operated in the presence of Freon. Operational failures of CO burners due to acid metal corrosion were common until Freon control became successful.

Cigarettes have also been indicted as the major source of the high aerosol concentrations found in submarine air, approaching 0.5 micrograms per liter or higher over long dives. Such aerosol concentrations may be clinically significant, may present an explosive hazard, and may additionally be involved in electrical grounds and other equipment failures. Electrostatic precipitators could be installed to achieve reduction of aerosol concentrations, but such devices are known to produce ozone under certain conditions. Ozone, of course, is one of the most irritant substances known with an 8 hour tolerance of 0.1 ppm. Here, again, we may be solving one problem only to meet another.

Hydrocarbon concentrations in the atmosphere have also been noted on all long dives to date. This includes aliphatics with smaller amounts of the more toxic aromatics, particularly benzene. The chief sources seem to be paint, deck wax, and a petroleum base solvent called "mineral spirits" used as a paint cleaner. There is a possibility of benzene contamination in all these materials, particularly in the solvents used in interior paints. It is not sufficient to prohibit painting when submerged; it should be stopped 2-3 weeks before long submerged periods as evolution of the solvent may continue long after the paint is applied. By such measures governing painting, by prohibiting use of deck wax while submerged, and by substituting soap and water for "mineral spirits" as a cleaner, ambient hydrocarbon levels were reduced more than 50% during the recent 60 day dive by SEAWOLF. Needless to say this strikes at the traditional Navy practice of "field day," but does spare the liver a good deal of trauma. In this connection, an additional substance that must be prohibited along with paint is shellac whose solvent is usually methanol, partial oxidation of which in a CO burner may yield formaldehyde at the burner outlet.

To summarize the problem of environmental atmospheric contamination—all materials, even the most innocent appearing, must be thoroughly scrutinized to determine their possible deleterious effects in the prolonged sealed ship situation. *This must include substances traditionally used and considered non-toxic, for this class can offer surprising toxicity under long submergence conditions.* Particular attention should be paid to possible toxic decomposition products of a relatively non-toxic parent substance present in the environment, i.e. Freon.

Radiation

Although radiation would seem to be the bête noir of a sealed ship environment, excellent engineering design has eliminated it to the point of only routine significance. While initially this topic was the cause for great concern, actual field experience has proven that atmospheric contaminants of non-nuclear origin provide a far more serious problem. Figures 2 and 3 indicate the frequency distribution of radiation exposure on NAUTILUS in 1955 and SEAWOLF in 1958, a

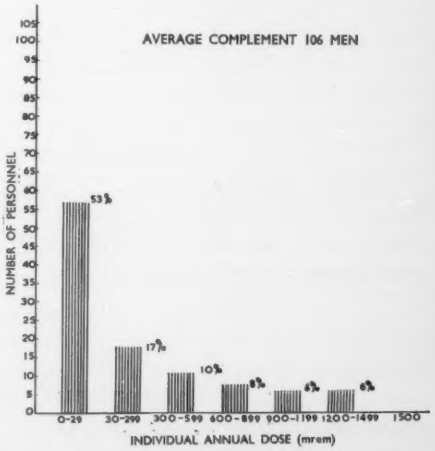

Fig. 2. Distribution of Annual Dose (mrem), USS *Nautilus*, 1955.

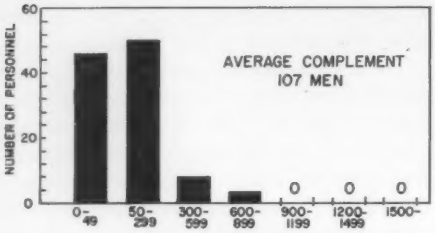

Fig. 3. Distribution of Annual Dose (mrem), USS *Seawolf*, 1958.

pattern which can easily be met in the future. In both cases the maximum individual annual exposure did not exceed 30% of the allowable industrial exposure per annum. Note in both cases that about one-half of the crews receive no measurable radiation exposure at all.

Summary

1. Certain basic similarities between the nuclear submarine and the space ship have been discussed, emphasizing their particularly close relationship through a common "sealed cabin" situation. Definite dissimilarities were also noted.

2. Atmospheric contaminant problems in the submerged submarine were discussed, including carbon dioxide, carbon monoxide, Freon, amine hydrocarbons, benzene, aerosols, and ozone.

3. Nuclear radiation was presented as less of a problem than the non-nuclear contaminants and metabolites listed above.

4. The "sealed cabin" situation in either inner or outer space may be considered as a special case in Occupational Medicine.

OVERSEAS MAIL FOR CHRISTMAS

Christmas parcels for members of the Armed Forces overseas should be mailed early. They should be securely packed in cartons of wood, metal, or double faced corrugated fiberboard. Fragile items must be packed with special care. If in doubt as to items that can be mailed consult your local postmaster.

MAIL EARLY

Occupational Health Problems in Space Flight*

Important Health Problems in the Man-in-Space Studies at the Aero Medical Laboratory

By

GEORGE KITZES, PH.D.†

WHAT are the important factors relative to man's health, mental and physical integrity that should be considered in manned space vehicles?

For many years the Aero Medical Laboratory at the Wright Air Development Center has been providing information, equipment and hardware such as oxygen equipment, masks, regulators, ventilation suits, pressure suits, and other protective clothing which, together with the aircraft engineering advances, enabled man to fly to higher altitudes and at faster speeds. This, I am sure, is known to most of us here today. Therefore, when the recent successful launching of satellites and rockets made it apparent that space activity for man was a near actuality rather than an item for the comic strip artists, the Aero Medical Laboratory did not find the transition difficult when asked to consider the practical problems of supporting man in space. Of course, the complexity and scope of the problems will depend on the duration of the flight and on the altitude. For purposes of this presentation, the discussion shall be confined to altitudes greater than 20 miles (100,000 feet) and not more than 100 miles, and to durations of flight and total mission of not less than 12 hours and not more than 72 hours which includes the launch, orbit, and re-entry phases of space flight.

By putting man into space within the confines of the foregoing parameters, for whatever reason he may have for being there—whether it be for a holiday weekend with a "get away from it all" attitude, which may be the ideal for many of us here today, or for reasons of mission which may be exploratory, scientific, or military—we find thrust upon us the problems of providing a safe, healthful, acceptable environment predicated upon the requirements of man and his accustomed way of life. Within the brief time allotted today, I can only touch upon the over-all requirements and their relative degree of importance based on what we already know and what future work remains to be accomplished. Whatever the solutions may be to the problems that present themselves, they will be resultants derived from compromises with respect to requirements, know-how, economics, and time. Weight, space, and power—both primary and secondary—are limiting factors to be contended with. Nevertheless, the full utilization of the human factors and engineering capabilities already existing in this country, coupled with the rapidly advancing "state of the art" of components and engineering technology, will make manned space flight a reality in the shortest possible time.

HUMAN REQUIREMENTS FOR SPACE ACTIVITIES

The primary objectives are to provide an environment, workspace, and sustenance of such a nature that:

1. Man is able to carry out his mission with maximum efficiency.

2. No irreversible body changes occur during his period of travel or extraterrestrial habitation.

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† Assistant Chief, Physiology Branch, Aero Medical Laboratory, Wright Air Development Center, Air Research and Development Command, Wright-Patterson Air Force Base, Ohio.

To meet these objectives, human requirements may be further categorized into seven sub-requirements:

1. Physiological
2. Psychological
3. Protection
4. Escape
5. Communication
6. Selection and Training
7. Ground Support

Because of time limitations, I shall review only the first three—namely physiological, psychological, and protection requirements.

Physiological Requirements

A. Metabolic
   1. Nutrients
   2. Oxygen
   3. Water
   4. Metabolic recovery (rest, sleep, waste removal—gas, liquid, solid)

B. Activity

C. Environmental
   1. Gas composition
   2. Temperature
   3. Pressure
   4. Humidity
   5. Gravity
   6. Optical factors

Many of these requirements are self-evident. Adequate food, water, and oxygen will be necessary to sustain man for the duration of the flight, including recovery or return to home base. Foods of low residue which form a minimum of intestinal gases will be selected, of high acceptability, processed and packaged in a form that minimizes weight and gives consideration to their consumption under conditions of weightlessness. Preliminary tests have demonstrated that weightlessness may not be a deterrent in food consumption. Provisions will be required for the collection of urine and fecal material, although the fecal problem will be greatly reduced for flights of short duration by use of low residue foods, before and during the flight.

Oxygen will be supplied to the cabin or directly to the man at a partial pressure of not less than 150 mm. Hg. Since the cabin will have to be pressurized to at least 5 psi (250 mm. Hg) to protect man against "bends" and vaporization of his tissue fluids, studies are being conducted to determine the optimum composition of the total gases in the cabin. Perhaps it will be possible to use only oxygen for both the respiratory and pressurization requirements.

The removal of carbon dioxide and water will be effected to maintain the concentration of CO_2 below 1% and the humidity at 20-50%. Temperatures of the ambient air will be maintained at 50°-80°F., although allowances may be required for higher temperatures for short periods of time during reentry. A temperature of 150° F. for 5 minutes or less has been found to be tolerable.

Considerable attention has been given to integrated closed circuit breathing and ventilating systems for the conservation and reuse of oxygen and water and environmental control. Eventually, closed ecological systems will be available to provide complete regeneration and reclamation of all gaseous, liquid, and solid materials needed and utilized in normal human metabolism. Several slides of various systems were shown:

(1) Closed circuit breathing—ventilating system (nonregenerative system)
(2) Closed circuit breathing—ventilating system (partial conservation of water, dumping of CO_2)
(3) Closed circuit breathing—ventilating system (conservation of all water, regeneration of oxygen)
(4) Closed ecology (man and plant—complete regeneration)

In addition to the physiological requirements of man, space travel will make exacting demands on his psychological processes. Included here are some of the more important areas that will require extensive studies to determine whether certain human deficiencies or limitations may be nullified or at least significantly modified by techniques of selection, training, and countermeasures.

1. Isolation and confinement
2. Reduced sensory environment

3. Weightlessness
4. Forced Association (multiple crew vehicles)
5. Workspace layout and presentation of information

For short duration flights, several of these factors will be relatively less important. Preliminary tests have already demonstrated the tremendous variation among individuals regarding their ability to accept a state of isolation in which they are separated from their accustomed behavioral environment. What is the explanation for the individual who was able to stay seven days in a completely dark, soundproof room, without organized or planned activity; while another equally willing volunteer gave up at the end of twenty hours. Except for true weightlessness (zero gravity), these factors will be further studied in simulators and other devices to augment our comprehension of their relative merits in terms of performance and stress tolerance.

Protection Requirements

In this category, the following problem areas are being studied to determine their significance as occupational health hazards.

1. Radiation
2. Toxic Chemicals and Odors
3. Noise and Vibration
4. Acceleration
5. Natural Infection
6. Disorientation

Accelerative forces and their effects on man in flight are familiar to many of us here today. Recent work, however, has clearly demonstrated that greater magnitude and duration of accelerative force can be tolerated when applied at right angles to the long axis of the body: e.g.—10g for 2 minutes. This semi-supine transverse configuration with force applied from front to back was used successfully in studies with the human centrifuge simulating the intermittent accelerations of a three-stage space missile. Peaks of 8 to 9g were tolerated for the first stage, with 5.6g for each of the two succeeding peaks. Deceleration patterns expected for re-entry have also been simulated on the AML centrifuge. Three g was well tolerated by the majority of subjects for periods up to one hour, and 9 to 10g for 30 seconds to one minute. Studies will be continued for methods of increasing human tolerance to g forces.

Collection of data from presently orbiting satellites indicate that space ambient radiations may not be a limiting factor at orbits below 600 miles and for space flights of short duration. Considerably more data is required, however, to define protective requirements and tolerance limits to ionizing radiation, and to heavy cosmic primaries. Health hazards from exposure to chemical materials in the space cabin appear to be minimal. In a closed circuit system, removal of certain gaseous chemicals may be required. Provision for this was shown earlier in the sketches of such systems. Formation of contaminants within the space cabin from exposure to radiation is a factor not to be discounted. Ozone was formed from gaseous oxygen exposed to significant amounts of gamma radiation.

Noise and vibration are two potential health hazards that are being thoroughly studied at the Aero Medical Laboratory. It has been reported that the noise level of a rocket launch may be as high as 120-140 decibels. Moreover, measurements of sound intensities in nose cones of ballistic missiles during launch indicate a possible requirement for protective equipment.

The scope of vibration during launch or re-entry is still to be clearly defined. Nevertheless, vertical accelerator studies at the Aero Medical Laboratory, although preliminary in nature, and by no means complete, are indicating that no critical problem exists.

This concludes a rather sketchy review of the anticipated problems of putting man in space without injury or detriment to his health. I hope that I did not give you the impression that we are ready to bid our "man" for space "bon voyage." On the contrary, there is much to do, although I am confident that the life support scientists will have the answers long before the button is pressed for "go."

Occupational Health Problems at a Missile Test Site*

By
LAURENT P. LAROCHE, M.D.†

I HAVE been asked to discuss occupational health problems encountered in our missile test operation at Cape Canaveral. I think it is most important that we all remember that ours is a test operation. We see these missiles during various stages of research and development, and in most every case before a great deal is known about their characteristics; the unexpected is the rule at Cape Canaveral. By the time we have completed our tests and have reached an operational level with a missile, we have pretty well identified the health problems incident to the use of that weapon system. However, this point is reached only after some months of intensive evaluation of all aspects of a given missile. During these months of tests, we are forced to adopt precautionary measures which may seem out of all proportion to the actual problem as that problem is defined during the test program. It follows then that certain elements of our occupational program are of a type which will probably never be required at an operational missile site. In addition, our effort must be so designed that we will recognize potential operational problems, and build into the weapon system those procedures deemed necessary to protect health and life for such time as the given weapon is added to the air force inventory.

A principal area of interest to us at the cape is to be found in the field of rocket and missile propellants.

An entirely new field is rapidly opening before us. It would appear that for the most part, the problem revolves more around the industrial medical operational guidance required than about the toxicology of the chemicals involved. Chemicals which were seldom previously encountered in quantities greater than that which might be contained in a laboratory reagent bottle are now dealt with in tank car quantities.

Instead of trained and hazard-oriented laboratory personnel, we now see these enormous quantities of extremely potent chemicals transported and handled by the average driver of our fueling trucks.

The decontamination and disposal problems arising by way of the quantities of these toxic chemicals have made many traditional practices obsolete.

It is not the purpose of this paper to discuss the details of the chemistry involved, but to outline the broader industrial medical areas of interest.

For this reason, it might be desirable to divide these chemicals into operational categories:

First, fuming nitric acid is an excellent example of the well known and well understood chemicals. Here toxicological characteristics have been the subject of much study by competent observers over a period of many years. The potentials for physiological injury are fairly well understood. It remains only for us to apply proven industrial medical practices to the use of these substances in this new missile environment.

Second, the group of chemicals which, while not strangers to the toxicologists, have not previously been used in quantities or under circumstances which warranted any comprehensive study of their toxicology. Unsymmetrical dimethylhydrazine is a good example of the chemicals in this group. Here we find a great deal of controversy concerning the hazard potential of this substance.

In certain instances, investigators have reported an extremely high incidence of physi-

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† Medical Director, Pan American World Airway, Inc. Guided Missiles Range Division, Patrick Air Force Base, Florida.

ological damage as a result of exposure to this compound, while in other cases equally knowledgeable investigators have reported little or no effects from exposure to significant concentrations.

It is anticipated that research now in progress will indicate that the circumstances of exposure will be most probably due to the magnitude of the handling problem, as contrasted with any unusual intrinsic toxic properties of the chemical itself.

Third, the exotic fuels, a group of chemicals just now entering into test operations or which are programmed for tests in the near future. This group is exemplified by the fluorides and borones. Considerable toxicological data are available concerning these chemicals; however, these data have for the most part been developed under laboratory conditions.

The myriad of big and little problems incident to the use of these chemicals in a missile operation has not yet been encountered. However, past experience has shown us that we can cope with new agents successfully by way of a rigid program of control and guidance and that the solution to these new problems in general might well be found in a sound program of industrial medical supervision and research.

Therefore, our concern at present is directed more specifically to a program of safe handling than to the toxicology of the agents themselves. We are certain that safe handling techniques can be developed. The real and pressing need is to educate our personnel so that they may know where the dangers lie, what are safe handling practices, what steps should be taken to offset the results of an accidental exposure, and what signs are to be recognized in chronic exposure. To accomplish this end, we have established at the missile test center a training program which will provide this guidance to all medical service personnel concerned with missile operations. To supply the data necessary to make and keep such a training program current and effective, we have further established an occupational health research laboratory at Cape Canaveral. This laboratory is embarking on a program of study and investigation of all the occupational health phases of a missile operation.

Divisions of this laboratory will conduct basic studies of the toxicology of fuels and oxidizers where required data is not available. Clinical investigations will be undertaken to attempt to develop diagnostic criteria for both acute and chronic exposures to these toxic fuels. Forensic studies will be made a part of this program. Divisions of this laboratory are also concerned with investigating the potential problems arising from isolation, fatigue, blast, noise and radiation. A major portion of the activity of this laboratory will be directed toward obtaining data necessary to support the industrial medical service of an operational missile unit. This effort is expected to: (1) develop adequate detection and sampling equipment, (2) develop necessary facility construction criteria, (3) develop suitable methods for decontamination, (4) develop safe and realistic disposal programs for the toxic missile fuels, (5) develop protective clothing and equipment as required by the military.

I realize the magnitude of the problem is difficult to convey in words. It must actually be seen to be appreciated. The problems at Cape Canaveral embrace the entire spectrum of occupational medicine.

There is a complete laboratory which contains every type of problem peculiar to occupational health. We have the commonplace: A highly paid critically needed fuel mechanic, who, with a long ladder on the rounded outside surface of a missile, tries to disengage the lox line from the bird. He is tired; he wears neither protective gloves nor helmet; if he is lucky, nothing happens; another time, he becomes a statistical occupational health injury.

Even in a completely normal operation, it must be remembered there is a blast and flying debris, most of which remains within the safety perimeter, but not always. You should also be aware of the long hours required to launch a missile; from sunup past sundown, leading into another problem is that of industrial illness. There are a large number

of engineers and technicians who have to be on hand at their post throughout the entire operation; too much coffee, too many cigarettes, tension with its resulting headaches and intestional upsets, gastritis and enteritis, are constant companions of the count down. A review of the dispensary treatment cards would somewhat indicate the days in which we had scheduled "shoots." Fatigue is no mean consideration and presents wonderful opportunities to study its by-products.

Again, ours is a test operation and as such we have failures. The press keeps the public reasonably well informed, but as you might expect, most often these releases are not the whole story. Explosions on the pad, or just above the pad, are spectacular, but if one can be ready for the unexpected, such explosions could more correctly be called "mishaps"; however, these explosions could happen anywhere over the cape, such as a missile returning unscheduled. In one instance the concussion scattered all of the large tools, as well as causing a whiplash injury to the power operator some two thousand feet away from the point of impact.

In addition, hazards just as real to us, which rarely make the press, are when the missile test is scrubbed and the missile required defueling. This large quantity of toxic chemicals presents more problems, and the procedure is less refined in the defueling operation. This fuel must now be disposed of, since in all probability, it won't meet the rigid criteria of our fuel analyses. Procedures have to be devised to dispose of the fuel which would render a pad unsafe for future operations; sandy ground and concrete retain large quantities of some of our chemicals for too long a time to be safe, and they are capable of releasing toxic vapors from the heat of the sun. The incinerator burning has to be timed with the wind directions.

These problems present a never-ending challenge to anyone who is connected with missile testing, particularly to us in the medical department. I know of no other operation where the engineer and the doctor have to work so closely together in the accomplishment of our country's number one priority, that of building our missile weapon.

In closing, allow me to assure you that at Cape Canaveral our greatest cause of injury is still the tool dropped from the top of a gantry, and our greatest cause of death remains the highway accident.

It is with justifiable pride we say that after five years of operation at Cape Canaveral, we have not experienced a single fatality which could be attributed to a cause peculiar to missile operations.

The Importance of Good Occupational Health Programs in the Military Service*

By
ROBERT A. KEHOE, M.D.†

THE THESIS that I shall undertake to support is that the man-made hazards of our modern technological society provide the greatest potential threat to our modern health and well-being, and that the military services, because of the nature of their responsibilities, are the first to come into contact with the new technological developments, with new materials and dramatic types of energy. Also, these services promote and often supervise industrial production of new and strange and often dangerous chemicals and new sources of energy.

Let me point out one other fact, the military services as a whole, looked at from the sheer size of their operations, constitute the largest industry known to us. If industries require medical and technical services in the field of industrial or occupational hygiene, this one needs it more than any of the others. This, also, is our government, the government and the representative of all of us. It should provide an example of how things should be done.

In an attempt to summarize, briefly, occupational health programs let me point out just a few things. First, the goal of these programs is the prevention of overt casualties, the loss of time, loss of manpower, and loss efficiency which arise out of lack of the military establishment and that of supporting groups under their supervision. I mention this in connection with the handling and the use of ordinary materials and equipment associated with the ordinary daily work—these are the ordinary problems of occupational medicine. Then, the handling and use of materials and equipment for specific purposes in the conduct of warfare—these are the extraordinary problems of the military occupation and environment.

The second point in the goal is the prevention of insidious injury and disease, especially of long term chronic partial disablement (coupled with the ample and unavoidable stress of warfare), and the loss of stamina of troops in the field and of supporting units, because of inadequate control of hazards arising from materials and equipment. This could indeed be costly in terms of the outcome of a war and costly in financial as well as human terms in times of peace and preparation.

The basic features of an occupational health program are the following:

Research. As occupational health programs are spoken of, generally, research is, not infrequently, left out. It is as though the necessary information comes straight from the voice of God. Actually it comes from our own efforts to learn, and research is, therefore, a *sine qua non* of occupational health, particularly in a society that moves as does ours, from one, to the next, and to the next technological development with great speed.

The military services make use of new materials and new techniques, with respect to materials and apparatus, under highly specialized conditions and often well in advance of their introduction into general industrial use. They have the greater need, therefore, for access to research on new materials and new sources of energy.

Personnel in the industries concerned with the production of these materials and pieces of equipment, and also military personnel, are likely to be subjected to exposure in advance of information that is required for

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† Professor of Industrial Medicine and Director, Department of Preventive Medicine and Industrial Health, University of Cincinnati College of Medicine, Cincinnati, Ohio.

safety. This is a part of the hazard and a part of the necessity of military preparation, and of military activity in time of war. And to this hazard as far as information that gets to be disseminated and made use of, the problem of military secrecy adds greatly.

Extensive and effective facilities for research in industrial medicine and hygiene, then, are needed. These have been difficult to obtain, and hence it is of the utmost importance that it be recognized that research then is one of the basic features of occupational health programs.

Application. It is obvious that the usefulness of the research of which we have spoken above lies in the application of the information obtained by research. This must be implemented promptly, and its implementation depends upon the availability of trained personnel. This brings us to the third item in the program.

Training of personnel. In our society, in this nation perhaps more than in any other, the basic pattern of the professional approach to occupational health is made up of the combination of the practice of occupational medicine in close coordination with the practice of environmental sanitation or, to use a more common term, with industrial hygiene technology and engineering. The concept, then, of preventive medicine in relation to occupation, has to do with the expert performance of certain techniques which require training and knowledge, acquired from research and experience.

We have learned here, today, of some of the problems that present themselves to our society, in the accelerated and emphasized form in which they present themselves to our military establishment. I should like to briefly conclude this discussion by pointing out to you a fact which we all know but of which we do not take sufficient cognizance. We are living in this period in what is, essentially, a man-made environment, or to put this in other terms by great effort, extensive research and great accomplishment, on the part of those who have preceded us; we have learned much that has enabled us to combat natural hazards of our environment and to live with them in relative comfort and in relative security. We have now come into a period in which we are creating for ourselves an environment that is essentially man-made and yet unnatural for man.

The period to which we can look forward is one in which this will be intensified, in which, in all likelihood the changes that occur within the next decade or two will be greater than those that have come about in the previous five or six decades, or perhaps in even a century of our prior experience.

We are then presented with the problem of finding the technical skill in preventive medicine and hygiene whereby we can live in this dangerous world we are creating, in comparative security. This lies ahead of us, and will take an enormous amount of work, with much greater resources in research, training, and practice than any of which we have dreamed in the past.

This, then, is the future I think of for occupational medicine and occupational hygiene in this country. I think the group here has had a very clear foretaste of what is in store for us in many phases and directions, in this technological environment in which we shall spend the rest of our lives.

Nutrition Research for Man in Space Flight*

By

BEATRICE FINKELSTEIN, M.S.,† AND LT. COL. A. TAYLOR, USAF(VC)††

FLIGHT vehicles of the future will travel at exceedingly high speeds and altitudes. For the aircrewmen to live and function efficiently in these projected fighter, bomber, and space vehicles, means and methods must be devised to extend man's capabilities. The research and development effort of the Aero Medical Laboratory, Wright Air Development Center is devoted to this problem. The physiology of man while operating these vehicles and also the ability of man to cope with the problems of extreme altitudes, speeds, and prolonged duration of flight are prime interests to the laboratory. Food, nutrition, food packaging, food service equipment, and food acceptability play a vital part in these interests. It is my intent to discuss with you, plans for feeding in fighter and bomber aircraft which will be operational in the not too distant future. Also to review for you, data now being obtained from research which relate to feeding in space vehicles of the future.[1]

AIR VEHICLES OF THE FUTURE

For aircraft now being proposed and those on the drawing boards, considerable emphasis is placed on the comfort of the man. The science of human engineering is playing an increasingly important role in the development of future weapons systems. Aircrews will operate at a cabin altitude equivalent to 8,000 feet or less. Cabin temperatures will be controlled and will range between 80 to 100°F. Humidity will approximate 50%. Aircrew mobility will be possible. This environment will eliminate the need for much of the protective and restrictive clothing now worn. Present plans indicate that these aircraft will fly at extremely high altitudes and speeds for shorter periods of time than high performance aircraft now in operation. However, durations of flight will be long enough to require food.[1]

During short periods of flight, foods suitable for "nibbling" will suffice. Liberal quantities of water and other liquids should be available. For longer flights, consideration will be given to the provision of complete meals. The mechanics of eating during these flights should present no problem. The weight of food and the space required to store it will, however, present a problem of considerable magnitude. A wide variety of concentrated, precooked dehydrated foods, and "ready to serve" foods will form the backbone of the feeding program. Many foods will be preserved by means of cold sterilization to eliminate the need for refrigeration. Foods will be packaged in plastic and cellophane wrappers and will be eaten directly from the containers. Minimal amounts of food service equipment will be available and that which is used will be constructed of extremely light materials.[1]

Experience to be gained from feeding in aircraft now being designed represents a prelude to feeding in space ships. However, the problem of feeding in a space vehicle is an intricate one. Prime consideration must be given to the length of flight. The type of food which will be feasible will be directly related to the duration of the mission. Our present concepts divide space feeding into three categories. First, there will be short periods of flight lasting not more than 2 or 3 days. Second, there will be trips of intermediate duration, i.e. those of more than 2 to 3 days and extending up to an indefinite number of

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† Physiology Branch, Nutrition Section, Aero Medical Laboratory, Wright-Patterson Air Force Base, Ohio.

†† Chief, Biomedical Division, Hq. Air Research and Development Command, Andrews Air Force Base, Washington 25, D.C.

months. Third, there may be very long duration flights, voyages which may last for years or even generations.[2]

Why should we consider time periods such as these? Each of these categories of flight involves specific problems of which food is but one. The three problems which time permits us to consider are related to weight. Many pounds of fuel and oxidizer are required to place a single pound of pay load in an earth orbit. It takes even more to effect a velocity sufficient to escape the earth's gravitational field and attain true flight in space. Weight conservation is, therefore, a highly critical consideration for space flight. Man must have oxygen every minute that he lives. Oxygen can be supplied in the most concentrated form as a liquid. Man utilizes approximately a pound and a half of oxygen per day or 550 pounds per year. Hence, the logistics of carrying adequate supplies of oxygen in a space vehicle soon become critical. Another of man's needs, and one which is more closely related to food, is his requirement for water. The average man engaged in light occupation needs approximately 2,200 ml of water per day. This includes the liquids he drinks and water contained in food. In terms of weight this involves about 5 pounds per day—an amount approaching one ton per year.[3] Once again, weight becomes a limiting factor. When an individual eats all of his meals at home, approximately 7 pounds of food are consumed daily. This includes the weight of inedible portions of food, food lost in preparation, and materials used in packaging the food. In addition, numerous items are needed for food storage, preparation, and service. Obviously, even for short periods of space flight, food such as that used at home would involve excessive weight loads. Stored food, then, is our third limiting factor.

What can be done about these three restrictive factors? In 2 to 3 day flights, it will be economical to carry liquid oxygen supplies, stored water, and ready to eat foods comparable to those now used in flight feeding. However, this will not be true for missions of longer duration. For space travel lasting more than 3 days, weight problems can be overcome by present technology for but comparatively limited periods of time. Briefly, one can say that by utilizing a source of energy, the atmosphere within a space ship can be controlled. Carbon dioxide can be broken down into its constituent parts, and the released oxygen can be re-utilized. Water can be recovered from the atmosphere. Water can also be reclaimed from body wastes, purified and made safe for use. Great savings in food weight can be effected by using concentrated and dehydrated foods. Of necessity, these will be the "quick-serve" type, packaged in light weight containers from which the food can be eaten. By the use of these foods, food preparation equipment can be limited to a means of heating food. With such a feeding program, one can estimate that the former stated requirement of seven pounds of packaged food as used at home can be reduced to half that quantity for travel in space.[2] Thus, our weight problems can be solved for a period of many days, i.e. until the weight of stored food becomes too great a penalty.[4]

This period of "many days" is difficult to define with any degree of precision. At this time it remains unknown—a value of X. However, for the purpose of discussion, let us estimate that 3½ pounds of packaged concentrated and "quick-serve" foods per day will provide a man with adequate nutrition. From this he will receive approximately 3,500 calories with the usual distribution of protein, fat, and carbohydrates and the necessary minerals and vitamins. This kind of feeding will involve 1,300 pounds of food per man per year of flight. The provision of a smaller number of calories would involve somewhat less weight; however, planning for amounts of food of this magnitude for long flights in space is unrealistic. Guess limits this X time value to 2 to 6 months, i.e. it might be feasible to carry a supply of dehydrated and concentrated foods for a 2 to 6 month period. A space voyage of longer than 6 months would probably exact too great a weight penalty.[2]

Once it is no longer economical to transport food, we must think in terms of regenerating carbon and nitrogen compounds.

Waste must be converted into food. Such a solution is related to the provision of oxygen for breathing. While plants produce oxygen, they also produce food for man and food for the animal life which becomes food for man. It is in this way that we get all of our oxygen and food on earth. Nature recycles water and regenerates carbon and nitrogen compounds. This regeneration has been going on for millions of years in the earth's great expanses of land, air, and water. A practical means to regenerate the carbon and nitrogen compounds man needs will remove all food limitations to the duration of space flight. Certainly, to install such a system in a space ship, the natural processes must be speeded up and condensed into a small space with little weight. The technical feasibility of such regenerative cycling is not in question. It is well established in nature. Research in the strict sense of the word is not required; but technical development and applied research are needed. Processes which take place on the earth to purify the atmosphere and produce our foods must be synthesized using some form of energy in a closed and balanced ecological system to be carried aboard a space vehicle.[2]

Actually some progress has been made in the direction of a solution. Algae in the presence of light absorb carbon dioxide and liberate oxygen.[5] Work is currently underway to find or produce a more efficient form of algae. In addition, there has been considerable speculation about the possibilities of algae as a source of food.[2]

Along with the weight, space, and time problems just discussed, there are many answers still needed to prevent the space voyager from being at a physiological and psychological disadvantage. It is my pleasure to report to you several of our research projects which seek ways and means of minimizing or overcoming these disadvantages.

Nutrition Study for Long Range Aircraft

A specially designed crew compartment has been constructed at the Aero Medical Laboratory to explore the operational problems of crews flying long range, high performance vehicles. Many facets of aircrew efficiency and human factors requirements are being studied. Data gained will be used to guide the weapons system planner and will also be applicable to feeding during space travel. For purposes of this discussion remarks will be limited to the feeding and nutritional aspects of the study. To-date, two trials have been conducted. In each, five men have been confined to the crew compartment for a period of five days. During these simulated missions, subjects perform a variety of tasks. These tasks are comparable to activities essential in operating an aircraft. Individual performance tests during duty periods measure vigilance, reaction time, and various intellectual functions. Heart rate and skin resistance are recorded at given intervals. Urine is collected for analysis of 17-hydroxycorticoids, uropepsinogen, and sodium chloride and potassium. All conversation between the crew members is tape recorded and all activity is televised.[1]

A food bar in the crew compartment combines storage and food preparation facilities.[6] At the bottom of the food bar, there is a frozen food storage unit. Above, are drawers for storing non-refrigerated food. In the center, a recessed area houses a food warming oven, an electric grill and a hot cup. Above the recessed space, there are additional storage drawers. Each storage unit is color coded and assigned to an individual. A bread drawer and the freezer unit are community compartments. However, all food contained in these compartments is colored coded. Thus, food supplies are subject identified. Each subject's food allotment provides approximately 5,000 calories per day. Subjects are free to prepare and eat food ad libitum at any time that they are not working. All food prepared but not eaten is passed through an opening at the rear of the crew compartment. Records of plate waste are maintained. A diary is kept by each subject of foods and quantities of each consumed at meals and as snacks between meals. Knowledge of the amount of food provided, plate waste data, and food remaining at the end of the test period permit a determination of the food consumed. Food pro-

vided in each of these trials consisted of a variety of precooked frozen meals, components of the in-flight food packet, fruit juices, soups, eggs, fresh and dried fruit, cheese, margarine, bread, and supplementary items such as cookies, candy, nuts, jam, jelly, condiments, and beverages. Foods not canned or frozen are packaged in aluminum foil and plastic materials so as to maintain freshness. Prior to the onset of a trial, a nutritional history of each subject is taken. Within circumscribed limits, foods are provided in accordance with the subject's food likes and habits. At this time, subjects are indoctrinated concerning the feeding program. A small brochure is provided for use in the crew compartment which includes food preparation information, an inventory of available food, and a series of recommended menus. Use of food service equipment is demonstrated. At the conclusion of the test period each subject evaluates the feeding program. Test participants thus far have expressed much satisfaction with the quantity, variety and acceptability of the food. Of the seventy-four available foods, none are considered unacceptable and none have been recommended for deletion in future studies. This positive attitude is confirmed by the small amount of food left on trays.[1]

The average food consumption per man per day during Trial 1 was 4,500 calories and included 150 grams of protein. The daily fluid intake from beverages, fruit juices, and soups approximated 1,600 ml per man per day. Many of these foods were consumed as between-meal snacks. Weight fluctuations of three subjects between the onset and the completion of the study were within normal variation. However, one subject gained seven pounds and another four and a half pounds. A nutritional analysis of the food eaten during Trial 2 revealed that approximately 2,800 calories, 100 grams of protein, and 1,600 cc of fluid from beverages, fruit juices, and soups were consumed per man per day. Quantities of food eaten at meals were less than in the previous study and there was much less snacking between meals. Body weight fluctuations of all subjects were within normal variation. Food and liquid consumption values for Trial 2 agree with recommended standards for persons engaged in sedentary activity and living in envoironments of comfortable temperature and humidity.[1]

Differences in the quantity of food consumed during Trials 1 and 2 can in part be explained on the basis of group dynamics. Subjects participating in Trial 1 volunteered for the assignment. They were interested in the over-all experience of living in confined quarters for the five day period. Many of the subjects were persons who in one way or another were involved in the planning and construction of the crew compartment. They were a high spirited and enthusiastic group. Off duty activity, for much of the time, centered around the food bar. Food, obviously, assumed intense social and emotional significance. It represented a phase of realism. This was evidenced by the amount of conversation about food, the sorting and counting of food in the food bar, and the frequent use of the grill in making sandwiches and fruit pies. For these subjects, food remained the central source of gratification when deprived of their usual satisfactions. Participation in Trial 2 was by assignment. Throughout the study, subjects gave the impression that they had a job to do and were performing it to the best of their ability. The group was sedate in manner, action, and social activity. Much less enthusiasm was devoted to leisure time activity. The group as a whole was task oriented. Little interest was directed towards those aspects of the experience which were not directly associated with accomplishment of the mission. It appeared that activity was concerned with matters of routine. Little, if any, use was made of the sources of extra satisfaction which were available. Differences in food conumption may also have occurred as a result of the publicity given to the large number of calories consumed during Trial 1 and the weight gains. This may have acted as an experimental contaminant.[1]

In summary, data conclusively indicate that

adequate and highly acceptable food can be provided to crews flying long range, high performance aircraft. However, differences in the amounts of food consumed indicate the profound emotional and social significance of food in stress stuations. To use a cliche, some persons will live to eat while others eat to live.[1]

Isolation and Confinement Study

During space travel crews will be isolated and confined to small areas for comparatively long periods of time. This will constitute an important psychological stress. Therefore, another phase of the Aero Medical Laboratory's search for significant life sciences information in space flight deals with isolation. In a current study, interest is centered in people's reactions to being alone in the absence of light and sound. Future contemplated studies will employ varying degrees of light, sound, and space, and varying tasks and sleep cycles. Sensory deprivation is achieved by placing subjects in a dark, sound-proof chamber. The chamber is furnished with a bed, chair, refrigerator, and chemical toilet. Study is centered on the individuals who are isolated, how they react, and the means they employ to defend themselves against the effects of isolation. Prolonged periods of time in isolation are necessary to study these factors. Hence, food becomes an important requirement. It is provided in advance. Foods which require packaging are put into plastic containers. Each food group is packaged in a different shaped container. The containers of different foods, within a specific group, are coded with masking tape and are distinguished by means of feel. Other foods, which can be distinguished by shape such as eggs or triangles of processed cheese are wrapped in aluminum foil. Subjects are appraised of the code system before entering the chamber. They are also indoctrinated as to the arrangement and placement of food, both in and out of the refrigerator.[1]

Dark-isolation trials already conducted have ranged from 6 to 168 hours. At the time of writing, thirty-five persons have participated in the study. Food has had varying degrees of significance. Some subjects have spent excessive amounts of time eating, nibbling, or counting food; others have become very angry with the food or very fond of it. Here again, evidence is strong that food in a situation of stress may be used as a tool to obtain personal satisfactions. Despite this psychological tie with food, caloric intakes are within normal range for persons engaged in sedentary activity in an environment of comfortable temperature and humidity. Subjects have consumed approximately 2,800 calories per day. However, eating patterns have varied. Some subjects snack on food at frequent intervals, others maintain the customary 3 to 4 meal cycle per 24 hour period. These differences may be attributed to the fact that the subject has no way of gauging the passage of time. Palatability and acceptability of food in many instances are contrary to that on the ground or in the air, e.g. brownies have enjoyed only a fair degree of acceptability whereas in ordinary situations they are highly acceptable; canned orange juice usually rates low in acceptability, yet in isolation it has moderate to high acceptability. Data also indicate that the ability to discriminate one food from another within the same food group is impaired. All meats taste much alike, and subjects are unable to distinguish one canned fruit from another. White, whole wheat, and rye breads used in sandwiches are similar in taste. Thus it is quite apparent that removal of the visual cues ordinarily associated with food interferes with its taste and enjoyment and therefore with the acceptability of food. Much effort must still be expended in determining variations in response to the stress produced by isolation. However, results will find wide application in the development of a suitable feeding program for the space voyager.[1]

High Altitude Balloon Flights

The U. S. Air Force in its endeavors to explore the problems of space travel is engaged in a series of manned high altitude balloon flights. The balloon when flown at

altitudes of 100,000 feet serves as a test bed for: (1) research in cosmic radiation; (2) photographic studies of the planetary bodies; (3) operational experience with sealed cabin atmospheres; (4) testing of telemetering devices; and (5) determining nutritional requirements in near-space situations. The following is a report of the "Man-High II" Balloon Flight performed during the summer of 1957 by Lt. Colonel David Simons, USAF (MC). Prior to this undertaking, the Aero Medical Laboratory was consulted concerning suitable food for both pre- and in-flight use. The Compact Box Lunch, a sandwich type of meal, designed for consumption over a 20 hour period, an in-flight food packet, and supplementary foods such as nuts, candy, and cookies were recommended. In addition, since this flight involved the use of the pressure suit which precludes defecation, a high protein, low residue diet for 72 hours prior to take-off was recommended. This pre-flight diet was not adhered to absolutely but was followed in principle. It was considered helpful and effective.

Food eaten during the flight was reported by Colonel Simons to have assumed the following pattern. During the first day while the pressure of making observations and the stress of the flight experience was at its peak, foods were selected which provided a maximum of energy and required a minimum of effort to eat. During a relatively relaxed period of the flight the in-flight food packet was eaten. The opening of the four cans in this meal served as a form of relief and diversion. During the descent portion of the flight, chocolate candy and nuts were consumed. Here, food served as a reward for a difficult job which was now near completion. This data though representing but one man's reaction suggests that ordinary food can be made available for short flights into space and eating can be accomplished with comparative ease at an altitude of 100,000 feet.[7]

Liquid Diet Study

The ability of man to eat under prolonged conditions of weightlessness is yet to be determined. The present state of the art does not permit simulation of weightlessness nor production of it for more than 45 seconds at a given time. This is hardly a long enough period to gather valid information concerning the mechanics of eating, ease of digestion and absorption, or nutritional requirements. Conjecture, surmise, and armchair philosophy relative to these matters will prevail until suitable vehicles become available for man to venture into space. However, prior to this time there is an urgent need to determine the effects upon man of the various stresses which we currently know will exist in space flight.

During preliminary ventures into space, travelers, for purposes of protection will wear a full pressure suit assembly including helmet and gloves. The handling and eating of food with such clothing will be difficult and awkward. For these situations, a liquid diet holds promise. Foods will be easy to manipulate when packaged in a "squeeze bottle" type container. Liquids will flow readily through a tube inserted into the face piece of the high altitude gear and can be swallowed with ease in a weightless state. The particle size of such food will diminish the mechanical burden of digestion. This represents an important consideration during a situation of stress. When normal gravity is removed for short periods of time, tendencies toward disorientation, discomfort, nausea, and motion sickness have been reported.[8] These conditions are conducive to aspiration of food into the lungs. Should this occur, deleterious effects will be minimized if food is in a finely divided form as in liquid foods. With these views in mind, a liquid diet, high in protein, adequate but minimum in calories for an individual engaged in sedentary activity and adequate with respect to the other nutrients was formulated. It was then evaluated for consumer acceptability and its physiological and possible psychological effects when consumed exclusively during a five day test period.

During June 1958, fifteen military and civilian men ranging in age from 21 to 29 years were recruited on a voluntary basis to participate in a study. Two daily menus were

alternated (see Table I). Meals were served in the nutrition laboratory. Fruit juices and a commercially canned chocolate drink were made available for mid-meal snacks. Throughout the test period subjects performed their usual laboratory activities. Each day's meals provided approximately 2,500 calories and 100 grams of protein. In order to provide this quantity of protein, two protein supplements were used. One was combined with coffee and the other with a vegetable puree. Protein was also obtained from strained meats and a concentrated ice cream mix. The average daily food intake approximated 2,300 calories and 100 grams of protein. Weight changes during the test period were insignificant. All subjects rated their physical condition as excellent or good at the beginning of the test and also at the end. Since weight changes were insignificant and the caloric intake adequate for the activity performed, the feeling of hunger which was reported may be attributed to the small bulk and volume of the diet. Both of these were less than in the ordinarily consumed mixed diet. As the test progressed, the incidence of hunger diminished. Gastro-intestinal disturbances reported were minor in nature. No subject curtailed his food intake or was in any way incapacitated. Inconsistent results were obtained relative to the gas-producing qualities of the diet. Thirty-three percent of the subjects reported the occurrence of gas at some time or other during the test. However, only one subject reported its incidence for four of the five days of the test.

TABLE I
LIQUID DIETS

Menu A	*Menu B*
Breakfast	Breakfast
Tomato Juice	Orange Juice
Coffee Drink	Coffee Drink
Mid-morning	Mid-morning
Apple Juice	Pineapple Juice
Lunch	Lunch
Chicken Drink	Chicken Bisque
Chocolate Milk	Chocolate Milk
Mid-afternoon	Mid-afternoon
Apricot Nectar	Apple Juice
Dinner	Dinner
Beef Drink	Vegetable Soup
Lemon Drink	Lemon Drink
Coffee Drink	Coffee Drink
Mid-evening	Mid-evening
Chocolate Milk	Chocolate Milk

Psychologically no adverse effects were noted. One subject indicated that he was irritable. However, his remarks were qualified by the statement that his work load was extremely heavy during the week of the test and that tension caused by this factor may have been responsible for his feelings. Throughout the test period the morale of the group was good. At its conclusion several subjects indicated regret that it was over. Preference ratings for each food at each meal were indicated on a nine point hedonic scale. Examination of mean preference ratings revealed a need to classify foods into two groups, i.e. (a) those which are commercially available and familiar items and (b) those which were prepared in the laboratory and have new and unfamiliar tastes. Foods in the first group were well liked. On the other hand, unfamiliar foods were initially disliked. However, as the test progressed and familiarity with these foods increased, preference ratings increased. This trend conforms to data obtained time and again by food technologists, e.g. poor acceptance was noted with the introduction of pasteurized milk, soluble coffee, frozen vegetables, and bakery mixes; yet today, these foods enjoy high acceptability.

Evidence obtained from this study indicates the feasibility of using a high protein liquid diet for preliminary space flights.

CONCLUSIONS

The solution to the problem of feeding in high performance aircraft and space vehicles is not solved. Needs pertain to: (1) a greater variety of concentrated and precooked dehydrated foods; (2) further advances in the cold sterilization of food; (3) improved methods of food packaging; and (4) development of lighter weight food service equipment. In addition, a wealth of information is still needed relative to nutri-

tional requirements and the acceptability of food when man is exposed to weightlessness and is confronted with varying kinds and degrees of stress.

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The Meaning of the Fly for Medicine

By
JOSEPH HIRSH†

WHILE specialty boards in American medicine are less than 50 years old specialism in medicine has an ancient history,[1,2] with its most intensive phase covering the past 150 years. Today there are 18 recognized specialty boards in the United States examining candidates and issuing certificates in 51 different specialties or subspecialties. Conservatively it has been stated by the Chairman of the Council on Medical Education and Hospitals of the American Medical Association at a conference on the subject of specialism, that "the end may not yet be in sight."[3]

The rise of specialism is by no means unique to medicine. And the forces bearing on its birth are common to many disciplines and endeavors—the sheer accretion of knowledge, the explosive rate of technological change, the complex growth of society, the institutionalization of professions and services and a myriad of economic factors. But over and beyond these, I particularly like the notion put forth by Dr. M. E. Prior, Dean of Northwestern University Graduate School, that specialism is "inescapable; excellence demands it."[4]

In another day Galdston[5] points out the specialist grew out of years of work, training and experience as a generalist. Today "men set out to be specialists before they have completed their undergraduate training."[6] From their first year in medical school they are at home with one electronics gadget after another, with oscilloscopes, polygraphs and spectrophotometers, but far too many graduate with less practical know-how than the MAC officer of World War II who was trained as an Assistant Battalion Aid Surgeon. While the stimulus of MEND and the threat of catastrophe may spur undergraduate interest in such simple, practical procedures as the proper application of a Thomas splint, a tourniquet, and mouth-to-mouth resuscitation, the problem is a broader one. In essence it is the need to maintain a sense of balance in the stampede of science in medicine, a need which recognizes the integrity of the individual, not merely his compartments, as well as the environment in which he lives.

In recent years our preoccupations with his inner biochemical and psychological environments have been so great that we have lost sight of his external environment and the malignant forces that habitate it.

Take our atmosphere for example. Throughout the world hundreds of millions of people in highly industrialized centers are living in air that is not fit to breath. A mixture of dust, dirt, chemicals and obnoxious gases hangs like a cloak over most cities endangering life and limb. Chemical analyses of these pall-like atmospheres indicate that their pollutants are capable of dissolving automobile finishes, stunting growth and preventing flowering of plants, corroding metals, even of etching stone. With the atmosphere laden with hydrocarbons and other carcinogens why should we not expect to find exactly what we are finding these days—a dramatic increase in the incidence in lung cancer? Newer and even more threatening pollutants, radioisotopes such as strontium-90, pose additional long-range health problems.

The polluted atmosphere is no vague threat for the future, to be relegated to those who teach or work in the laboratory or who have curious epidemiologic interests. It is a penetratingly pertinent medical problem and should be of concern to all physicians now. In recent years scores of cities throughout the United States and Europe thousands upon thousands of patients with

† Assoc. Professor, Preventive and Environmental Medicine and Asst. MEND Coordinator, Albert Einstein College of Medicine (New York); Lt. Col., MSC-USAR, Branch Medical Director, 1026 ARSU.

respiratory and cardiac difficulties have worsened and died when inversions have prevented polluted air from rising and drifting off. And whenever and wherever such catastrophes have occurred they have caught physicians unawares and as baffled as the first physician must have been in the first epidemic of plague.

Biological vectors are just as alien to most physicians. Far too many feel that these agents must be relegated to another period of history or to other disciplines, thus overlooking the simple fact that the natural history of disease is dominated by such vectors.

Should man compound his characteristic follies by embarking upon another war it takes no prescience to suggest that it will not be solely with nuclear, biological or traditional weapons but probably all three. The consequences of nuclear blasts will be the destruction or contamination of our water supplies, the disruption of waste disposal systems, the contamination of the food we eat and the air we breath. The superimposition of biological agents would make our casualties incalculable. But would this actually be necessary? Not if we are to judge from some of the simple truths furnished us by only one vector, the housefly. In peacetime the story is impressive; in wartime—against the back-drop of uncovered excreta, unburied corpses, unrefrigerated food, undisposed refuse, and unremitting confusion—it is ominous.

To understand the importance of the fly to human-kind we must start out by understanding something of the fly's sex life which Shakespere applauded in *King Lear* in these terms: "and the small gilded fly does lechere in my sight. Let copulation thrive!" And with the fly it does.

By and by—from 4 to 8 days after copulation—egg-laying begins. The eggs are deposited in that warm, odorous fecund atmosphere for which the fly is so famous—in the feces of the pig, the sheep, the horse, the cow, and even human. Feces are their birthright and their destiny.

Depending upon the warmth of the fecal material the larvae will hatch from 12 hours after the eggs are deposited up to a few days. After going through a succession of larval and pupal stages taking up to 20 days the adult fly emerges and is ready for flight.

The fly's remarkable fecundity theoretically makes it possible for a happy couple to produce through their own capabilities and those of their children and grandchildren in *one summer* 325,923,200,000,000 offspring. Fortunately for us, in point of fact no such increase actually takes place in nature. The mortality of eggs and intermediary larval and pupal stages through dessication and cannabalism is enormous. An index of the fly's prodigious survival capabilities, nonetheless, can be judged by the findings of 868 pupae in only one ounce of manure taken from subsurface soil. Assuming a 30 percent mortality at this late stage, over 600 adult flies will have emerged from this one small sample of manure. And for them the world consists of one delicacy after another.

The fly is a happy voracious, omnivorous feeder. It delights in such tasty morsels as sputum, fecal matter, and discharges from wounds and open sores, preferring such delicacies even to whipped cream, sugar and other substances which we may regard as more wholesome.

The fly does far worse things than just get into the ointment; he gets into or onto pretty much everything we eat or drink. If the fly restricted himself to one group of foods or the other he would have no particular social or medical significance but the sad fact is that he evidences the same gustatory joy over slop as over sweets.

If the fly were exclusively one or the other—a food or a filth and fecal feeder—it would not have much meaning as an agent responsible for the transmission of over 30 human diseases. But the reality is that the fly feels just as much at home in the kitchen as in the privy and the frequent trips it makes back and forth do much to explain its deadly characteristics.

The fly's natural uncouthness is compounded by its lack of native or man-made

tools. It has neither table utensils nor teeth and like an old man it must feed on liquid materials or materials which it liquefies. Water, milk, tea, beer are its natural foods. Solid materials, however, must be prepared for ingestion. It is tricky in the way it goes about this preparation.

In addition to a stomach the fly has a ventral crop in which it stores the semi-digested liquid food of earlier meals. This food is capable of being regurgitated apparently with the greatest of ease. Thus, when a fly explores a piece of Barricini chocolate, the appetizing surface of a lemon meringue, the tender cut of tenderloin, some buttered toast, it does so by extruding a drop of vomitus on to this food and then sucking up the sampling *and* the vomitus. In the event that the sample is too solid to pass through the fly's pseudotracheae it merely adds additional vomitus until the food reaches the desired consistency.

While this is happening, of course, the fly, like a cat on a hot-tin roof has deposited in the meantime on the surface of the Barricini chocolate, the lemon meringue, the steak and toast abundant evidence of its more recent peregrinations in the privy. There are, moreover, portions of vomitus left on every surface which the fly explores. Some scientists with an accountant bent have observed as many as 1100 vomit specks on a pane of glass 6 inches square. In the same area there are only 9 fecal specks suggesting that the fly deposits infectious material more often via its mouth than its tail.

Actually the adult fly transmits infectious organisms in several ways. Microorganisms, cysts and parasites cling to its body hairs from which they are dislodged during locomotion or by the dainty cleansing process which appears so human-like in the way the fly brushes his body or "washes" his hands and feet. The sticky tenent hairs of its feet —which make possible its acrobatic antics on walls and ceiling serve the more deadly purpose of capturing and retaining pathogens which are so casually deposited during locomotion.

By regurgitation of its vomitus and defecation the fly simply, regularly and abundantly spreads pathogens. Its alimentary tract is a kind of incestuous world of its own. In the warm, moist protected atmosphere of the fly's gut, bacteria, protozoan cysts, certain helminth ova and a number of viruses happily multiply and flourish only to be passed on at a later time as salt and pepper fecal sprinklings on food. This capacity for such speckling is fantastic—at the rate of every 4½ minutes throughout the day.

It is scant comfort to know that flies are not merely the carriers and incubators of pathogens. In many instances they, themselves, fall victim to the organisms they disseminate.

Among the *bacterial* diseases* transmitted to humans by the fly are the following:

Typhoid fever
Paratyphoid fevers
Cholera
Bacillary dysentary
Infantile diarrhea
Anthrax
Non-specific conjunctivities
Tuberculosis
Leprosy
Plague

Among the *viral* diseases transmitted with the fly's help are:

Trachoma
Poliomyelitis

Among the *spirochaeteal* and *protozoan* diseases transmitted with the fly's assist are:

Yaws
Amoebic dysentery
Giardiasis

In addition the following parasites, disease producing in man, are capable of being transmitted by flies:[7]

Endamoeba coli (intestinal amoeba)—flies carry cysts.
Endolimax nana (intestinal amoeba)—flies carry cysts.
Chilomastix mesnili (intestinal flagellate)—flies carry cysts.
Enterobius vermicularis (pinworm)—flies carry ova.
Ascaris lumbricoides (roundworm)—flies carry ova.
Trichuris trichura (whipworm)—flies carry ova.

* There are additionally, a number of other diseases flies transmit to domestic animals.

Ancylostoma duodenale (hookworm)—flies carry ova.
Taenia solim (pork tapeworm)—flies carry ova.
Dipylidium caninum (dog tapeworm)—flies carry ova.
Hymenolepis nana (dwarf tapeworm)—flies carry ova.
Hymenolepis diminuta (rat tapeworm)—flies carry ova.
Echinococcus granulosus (hydatid cyst)—flies carry ova.
Dermatobia hominis (human botfly)—houseflies may carry eggs.

While *Musca domestic* lives in close proximity with humans, it is anything but domesticated. In peace, let alone war, the fly cannot be taken lightly, or passed off as someone else's business. It is, as Ralph Waldo Emerson described, "as untameable as a hyena" and everyone's business—physician, sanitarian and engineer most of all.

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It gives me great pleasure to acknowledge the important insights on this subject derived from Dr. Marcus D. Kogel, Dean and Chairman of the Department of Preventive and Environmental Medicine, Albert Einstein College of Medicine. As a Colonel, M.C., U.S.A.R. and Director of Preventive Medicine at the Medical Field Service School at Carlisle during World War II, Dr. Kogel, through his lectures to the Medical Officers-in-training, gave to the fly in rich and profane rhetoric the immortality it so justly deserves. If some of these qualities have made their appearance here, the credit or blame must be appropriately shared.

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EDITORIAL

Indexing Medical Literature

FOR almost a century, observers of the growth of medical literature have been looking with alarm upon the fantastic birth rate of the books, pamphlets, and journal articles which members of the medical and allied sciences are keeping on producing year after year and month after month. Indeed, the annual production of medical printing is so tremendous even in a single country of Western Europe that a doctor would have to abandon his medical practice entirely just to gain sufficient time for reading the whole professional literature of his own country. And when we consider that the presses of every country of the world are tributaries of the gigantic river of printed medical word, in our amazement we may come to the conclusion that such a flood of printing does perhaps more damage than good; that the unwieldy river is in urgent need of control.

There are various theoretical possibilities for regulating the medical literature, and all of them have been proposed and considered by the various professional experts, producers and publishers alike. Of course, the most natural and radical measure would be some kind of control at the very source of medical thought, in the laboratories of research, at the clinics, and other medical institutions, where this "control" could take the form of a "guidance" rather than the hated form of regimentation of thinking. It should result in a more or less self-control, a healthy repression of the "itch of writing" (*pruritus scribendi*) and a wise following of the ancient Horatian rule of publishing (*"nonum prematur in annum"*) which suggests to keep the manuscript in the desk-drawer for a while until it ripens to perfection. Control of this kind, at the first echelon, seems to be both outmoded and impossible in this Age of Rush and Push.

The next echelon where a successful control of the flood of medical literature is possible to some extent is the editorial desk of the many professional magazines and publishing houses. But, even though the regulating function of editors is an ideal opportunity for raising the professional level of the medical articles and books, the pressure from behind, from the first echelon, is so tremendous that the editorial resistance of the high-level medical journals and publishing houses could only detour the direction of the flood toward the large number of less critical serial publications which have been growing like mushrooms all over the world. Hence, in desperation, someone jokingly suggested that every so often the publication and printing of all medical journals should be suspended for half a year (maybe for the benefit of the indexers!).

After a book or an article had been published, it cannot be further "controlled" or regulated, except by the book-market people, the public prosecutor's office, and by the librarians in whose hand any kind of "control" of the literature is tantamount to censorship. Any *selective* list or index or catalog of articles and books in which the arrangement is made not by the logic of the subject-matter but by arbitrary rules is a form of censorship. Sometimes such selective lists are offered to the public as a *"faut-de-mieux,"* a substitute in lack of something better because the preparation of the better would require large sums of money, and technical and professional facilities which are unavailable in the institutions issuing the list or index.

The uncontrollable flood of medical literature is in great need of periodically issued guides which would show the more important reference points over the field of medical

research. These guides to reference points will naturally omit many publications "in toto" (this is called by the unfortunate term "effective bibliographic control") because they are unable to comprehend everything with their limited facilities. Such periodically issued medical guides are numerous, and all larger countries of the world are publishing them.

In the United States, the large-scale, yet still incomplete, indexing of the medical literature has been carried out in recent years at two places:—at Chicago where the American Medical Association has been publishing its quarterly (?) *Cumulative Index Medicus,* and at Washington where the National Medical Library has been compiling a monthly *Current List of Medical Literature.* Though both of these lists are selective and in some way duplicate each other, both publications are lagging behind the speed of flow of the medical literature. Now, the A.M.A. publication is four years behind times, and the monthly issues of the Current List are 6-8 months behind the date of their indexed articles.

It has been recently announced that the two indexes will cease in their old form, and their efforts will be combined from January 1960 on to publish a *reborn* "Index Medicus" (monthly) with the aid of the most modern technics of rapid reproduction. This will be done by the National Library of Medicine, Washington, D.C. There will be an annual *Cumulated Index Medicus* published by the American Medical Association, Chicago, Illinois.

Subscriptions for the *new* "Index Medicus" (monthly) will be taken by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., while those for the *Cumulated Index Medicus* (annual) will be taken by the American Medical Association.

PROPOSED AMENDMENT TO THE BY-LAWS OF THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES

Action will be taken by the members of the Association of Military Surgeons at the 66th Annual Convention, November 9-11, 1959 on the following proposed amendment to Section 5 of Article XII of the By-laws:

"In order to provide sufficient capital for meeting contingent or expected payments from the Retirement Fund, the Executive Council (a) may at its discretion pay to the Treasurer of the Retirement Fund from the funds of the Association such amounts from time to time as the Council deems suitable, and (b) may at its discretion from time to time change the percentage of the current income of the Association to be set aside for the Retirement Fund, provided said percentage shall not be less than four percent (4%) nor in excess of eight percent (8%)."

SECTION 5, ARTICLE XII OF THE BY-LAWS PRESENTLY READS:

"The Retirement Fund shall be constituted by setting aside and paying to the Treasurer of the Retirement Fund Trustees four percent (4%) of the current income of the Association, including all of any income or funds set aside and specified to be for said fund, including accretions on the capital belonging to said fund but excluding accretions on the capital of the Association which are not a part of said Fund."

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Around the World

(Ser. III, No. 12)

By

CLAUDIUS F. MAYER, M.D.

LEBANON'S medical problems were described a few months ago by a doctor of Lebanese origin (M. H. Shamma'a) who emphasized that, in lack of proper statistics, our knowledge on *diseases in Lebanon* was very limited. On the other hand, due to the central position and the more advanced status of Lebanon and Beirut, this country may be considered *typical for the entire Middle East* of Arab culture. Medical practitioners have still to face many cases of typhoid fever and other enteric infections. Bacillary dysentery is also common, and it especially likes to attack newcomers in Lebanon. All species of intestinal parasites are found, but amebiasis is perhaps the most important (17% of all stool specimens were found positive). Among the native Lebanese, 19% are infested with Taenia saginata. Echinococcosis also has a high incidence. Of the viral diseases, several are endemic in this country such as poliomyelitis, infectious hepatitis, but especially trachoma (37% of the poorer inhabitants are infected). Of special interest is the so-called *"periodic peritonitis,"* or Armenian disease, an ailment with abdominal pain, fever, leukocytosis, increased sedimentation rate, recurrent at short intervals for many years. Many acute surgical abdominal emergencies are imitated by this sickness, but nothing more is found at operation beside a mild sterile peritonitis.

The origin and the kinship of *Australian aborigines* is not known, but anthropologists, sociologists and medical men tried various ways to deduce evidence concerning this subject. Biometric measurements suggest the possibility that the Australians comprise three or four different people. Another approach to the problem would be to study the cultural, religious and linguistic composition of these people. But such evidence shows that the Australians are too unique in these respects. Also, so many genetic and environmental factors interplay that the aborigines cannot be understood in their *genetic isolation*. Studies by means of fluorine and radiocarbon determinations point to a possible age of this race of about 10,000 to 20,000 years. The best chances in the study of the *descendence of the Australians* come from the study of characters which are determined by a single gene; such characters are the blood groups, the haemoglobins and the haptoglobins. A recent study showed that Australian aborigines have no other haemoglobin but the normal adult Hb A. This may give rise to various interesting ethnic speculations.

By the way! The letter *"Q" in the Q-fever*, or Coxiella burneti infection does not stand for "Queensland" though the disease was first recognized in that part of Australia in 1935. "Q" in this context actually means "query," as the Editor of the Medical Journal of Australia assures us.

A British Surgeon-Rear Admiral recently suggested the following *principles for a transfusion service* which is planned for large continental countries where the climate is generally hot: (1) The wholesale use of blood should be discouraged, and blood should be employed only where blood is essential in order to save life. (2) When a whole blood transfusion is essential, fresh blood transfusions should be employed as much as possible rather than use of stored blood from a bank. Blood keeps indefinitely in the donor, and storage in him costs nothing. Blood in a bottle will keep only a few weeks, and storage in a hot climate is very expensive. It is again easier to transport a donor to the patient than a bottle of blood. (3) As a blood volume expander, full reliance can be placed on *Dextran*. It can be

stored under the cheapest possible conditions. It requires no protection from heat or sunlight, and is therefore the safest and cost economical product to distribute.

With so much controversy about radiation hazards, it was also natural that the question came up whether the *radiologists* would have a greater *risk of death from ionizing radiations*. The question was recently answered by the investigation of the membership of two British radiological societies. About 1,377 radiologists were included in the final study. They were divided into two groups, those who started their radiological practice BEFORE 1921, and those who started it afterwards. This was namely the year when the dangers of ionizing radiation were generally recognized. The study showed that in the BEFORE-1921 group there was a slightly larger number of deaths from cancer (of the skin and of the pancreas, an especially sensitive organ), and from leukemia than in the POST-1921 group of radiologists. Indeed, the study concluded that the specialty of the radiologists is no risk to the individual man in the sense that it would reduce his life expectancy. (NOTE: This seems to be opposite to the 1956 results of the U.S. National Academy of Sciences where Warren employed a—according to the British radiologists—less satisfactory technique of research.)

In England, a Departmental Committee on *Artificial Insemination* was established, briefly called the Feversham Committee. It was asked to inquire into the existing practice of human artificial insemination, taking account of the interests of individuals involved and of the society as a whole, whether any change in the Law would be necessary or desirable. The topic is controversial to the utmost all over the world. Thus, at the February 1959 meeting of the Catholic Physicians' Association and of the Union of Catholic Jurists in Roma it was declared that human artificial insemination is *contrary to the natural law* in the generally practiced manner. It could be tolerated only as an adjuvant to the "actio naturalis." Later on, in April of this year, an Italian congressman presented to the Italian Congress a *"Bill against Artificial Insemination"* which intends to outlaw this practice entirely.

In Italy, the BCG vaccination is gradually replaced by the use of a diffusible antituberculous vaccine which was first proposed and produced by G. Salvioli. The *Italian V.D.S.* (= "vaccino diffondente Saliviani"), which is a vaccine of *killed tuberculosis bacilli,* mostly of the human type, mixed with hyaluronidase, works in one single injection. At the site of the vaccination a miliary dermal node appears which can persist for 2-4 months. Then, in the reviving phase, a modest tuberculin allergy is revealed by the V.D.S. test, and an intensive bacillary allergy. This phase is followed by the regressive phase, with the formation of a small scar.—Wholesale test vaccinations showed that the V.D.S. is harmless, and that such a vaccination gives full protection to young children. The new vaccine, which is manufactured by the Milano Serotherapeutic Institute, has been also tried in Japan.

Observations in *Dar-Es-Salam,* Tanganyika, and in villages of Ghana showed that the *small* lizards which run all over the walls of the houses are not entirely harmless, and, as far as *transmission* of disease is concerned, they are as bad as mice. Their intestines harbor a large variety of Salmonella species. Their droppings could easily infect food or contaminate appliances which then would result in paratyphoid infection and diarrhea of the household members.

Under the auspices of the U.N., Italian *Somalia* will become *a new state* on 2 December 1960. Somalia, in the Horn of Africa, is a sand-ridden country, mostly populated by nomads. It is about 500,000 square kilometers, with an estimated population of 1,250,000. Of these, 75% are nomadic or semi-nomadic pastors. Another group of the Somalis is living in British Somaliland, and in the small French Somaliland. The three lands form one of the largest areas of sub-Sahara Africa. The newly to-be created Somalia stretches along the African shore of the Indian Ocean from Kenya at the South, northward up to the Gulf of Aden. It is one

of the poorest countries in Africa. Its two larger rivers, the Uebi Scebeli and the Giuba, permit some intensive agriculture. Somalia has a unifying thought in Islam, but otherwise the people are rather individualistic.

Civilization came *to Somalia* after 1905 with the progressive colonization by Italy, but the people of the country remained politically immature and illiterate. The main cities are Chisimaio in the south, Mogadiscio and Obbia in the mid-part of the coastal area, and Bosaso on the north. The inland towns are Baidoa, Bulo Burti, and Galcaio. The country is very backward in respect to education. The major obstacle is the *absence of a written national language.* People cannot decide whether the Somali language should be written in Roman, in Arabic or in other characters. In the *field of medicine,* education and the stress on modern hygienic methods begins to change the traditional approaches. More and more Somalis go to the infirmaries, clinics, although religious leaders are still sought out for cure of the sick. Various international organizations of medicine aided in the fight against malaria, tuberculosis and other diseases.

In *Thailand,* a new approach has been applied to *dealing with leprosy.* Formerly, the lepers were rigorously isolated. Now, leprosy is looked upon as a general public-health problem. As such it has to be controlled, and its incidence reduced. But, the peculiarity of leprosy defies the ordinary measures available to public health. Personnel has to be trained, then the area has to be surveyed before a concentrated attack can be made against this disease. Thailand has proceeded along this line, at least with its *pilot project* in the Khon Kaen Province. Here, the lepers were detected, registered, and treated by chemotherapeutics, with the aid of a trained staff of 25 members. Among the 600,000 inhabitants of the province, 5,000 were found to be lepers, which is about 1% leprosy of the total population. The project will be now enlarged, and in the next ten years all areas of Thailand where leprosy is a health menace will be adequately integrated in an organized fight against the disease.

The leprosy fight in China goes along with some communist admixture. In *Haiyan County,* Shantung, the Chinese Government established *a leper village* in 1956. It has a clinic, equipped with a laboratory and supplied with medicine. Special doctors treat the patients every day at appointed hours. Before the establishment of the village, about 429 lepers have been living in this Chinese county, and they were a threat to the health of others. The village was organized around an old temple, the Mengta temple, which had 69 rooms. The temple was repaired and the new inhabitants were given many acres of land in the neighboring hills, together with farm animals and implements. A library was also arranged with 1,000 books. It is very characteristic that the first patients or inhabitants selected for the village were members of the Communist Party. Later admissions to the village were granted if the application was first approved by the Communist administrative committee of the village. This is another example how the Chinese try to imbide *medicine, health, and everything with Party politics.* There are several other Chinese leper villages such as Put'ien, Yiench'en, T'anch'en, and others. Effort is being made to isolate all lepers in China.

Besides leprosy, tuberculosis is still one of the greatest threats in Asia. The extent of *tuberculosis in Asia* can be realized from the fact that in India, which according to the 1951 census had about 360 million inhabitants, about 500,000 persons die annually from that disease, which means one person per minute. The cause of this great toll of death is not the tuberculosis bacillus alone but such other social factors as the low standards of living, malnutrition, overcrowding in homes and schools, industrialization and occupational conditions, unsanitary housing, and lack of health education. The control of tuberculosis is therefore the great *national problem of India.* The BCG immunization campaign is progressing at the rate of two million tuberculin tests and vaccinations per year, which is of course so slow a rate that not even a century will suffice to reach the

entire population of India. The situation is *not better in Japan,* where out of 90 million people still over 90,000 die annually from tuberculosis. Here also, the rate of B.C.G. immunization appears to be very slow. Until 1955, only 8 million persons were vaccinated.

In *Taiwan,* including also the Pescadores and about 74 adjacent islands, the total population is about 9 million. The mortality from tuberculosis was very high a few years ago, but from the 285.2 per 100,000 high in 1947 the rate has now reached 66.8 per 100,000 (in 1955). The Taiwan *Tuberculosis Association* was established in 1953, and it has done much, since, for the eradication of the disease. Approximately 80% of the younger population (below 20 years of age) of Taiwan have been vaccinated with BCG.

In recent years, several mass *epidemic food infections* broke out *around Tokyo.* The food which was blamed for the infections was usually the tamago-toji (scrambled-egg soup). Such an epidemic occurred, for instance, in patients and staff members of the Sagamihara National Hospital when 425 out of 1,256 persons became sick with diarrhea a few years ago. A team of doctors from Kanagawa, Tokyo, and Yokohama studied this infection, but their efforts could not find any bacteria to blame. Hence, the disease is considered a new type of viral gastroenteritis.

A Japanese pediatrician of Akita described a *new syndrome of anemia* which occurs in young children of the kindergarten age. The syndrome is the repeated *lip-biting* during the examination (mostly the lower lip is bitten with the upper teeth). It cannot be observed in children who have red lips naturally or artificially. Thus, a patient who likes to chew on his lip should be tested for anemia.

There are still some *Japanese stragglers in the Philippines* who think that the Second World War is still not over. Two of these stragglers are on Lubang Island, in the province of Oriental Mindoro. Now, a Japanese woman radio announcer came to help the Philippine constabulary to obtain a peaceful surrender of the two hold-outs.

Among the deaths of illustrious persons of recent months we noticed that of Prof. Giuseppe *Bastianelli* (1862-1959), emeritus professor of the University of Roma, and a member of the Italian Supreme Health Council.

It was found that the *adrenal glands in the Jamaicans* are much smaller than in the Europeans. Most of the Jamaicans are of African or mixed African descent, and smaller adrenals were also found as a common feature of Africans. Biochemists also noticed that the endocrine pattern of Africans differs from that of the Europeans. What part the smallness of adrenals and the *inadequacy of adreno-cortical reserve* may play in Jamaica's colored patients remains to be seen. It has been observed that in Jamaica there is a high proportion of renal hypertension; that myocardial infarction is rare; that polyarteritis nodosa is practically unknown. Keloids are frequent. Peptic ulcers are also frequent but they will rarely perforate.

Reports from Russia indicate that Sabin's new *oral poliomyelitis vaccine* is a great success. The advantages over the Salk vaccine are: (1) easier administration, one drop by mouth, (2) great economy in production (100 times more economical than the Salk vaccine), (3) harmlessness and effectiveness in 90% of the subjects which were treated.

With the increased coming and going of the Russian politicians to our country, attention is now focussed on many *details of the Soviet Union.* We give below a few data which a communist propaganda publication (Sowjetunion von A bis Z.Berlin, 1958) printed, in the form of questions and answers. The first natural question is: *How large is the Soviet Union?* It has 22.4 million square kilometers (including the White Sea and the Azov Sea), which is about one sixth of the inhabited area of the globe. Only 5.6 million square kilometers of this area are in Europe. Thus, the U.S.S.R. is three times larger than the continental United States, and the sun needs more than eleven hours for its transit through Soviet territory. This requires the creation of 11 time zones. When

the bells of the Kremlin play their midnight serenade, at Cape Deshnev, on the Chukch Peninsula in the Far Northeast of the U.S.S.R., it is already 10 o'clock in the forenoon of next day. Measuring its circumference, the total length of the border line is 60,000 Km, 40,000 of which are sea borders. The most northern point of the U.S.S.R. is Cape Chelyuskin on the Taimyr Peninsula where the winter lasts 9 months and its coast is ice-blocked most of the year. From here to the most southern point in the oasis village of Kushka, at the Soviet-Afghan border, the distance is 4,600 Km. The express train needs 13 days from Kaliningrad (the former Königsberg) to Vladivostok, the big harbor in the Pacific. It travels about 10,000 Km, crossing the Ural which is the fence between Europe and Asia.

How many inhabitants are in the U.S.S.R.? There are 200 million people in round figure. This puts the Soviet to the third place in population statistics. China has 590 million (1953 figure), and India has 381.7 million (1955 figure). The birth rate in 1956 was 25.0 per 1000, the death rate 7.5 per 1000, and the rate of natural growth 17.5 per 1000. The *average life expectancy* in the U.S.S.R. is now 63 years for men, and 69 years for women. The social composition of the people is an arbitrary figure in the hand of the statistician. It is said that 59.5% of the people are workers and employees, 40.0% are kolkhoz farmers and union workers, 0.5% are independent farmers and artisans, and *zero percent is the figure of land-owners*, middle- and high-class bourgeois, merchants and kulaks. The distribution of *inhabitants by States* shows that about 113 million of them are living in the Russian Federation (the "RSFSR" whose capital is Moskva with almost 5 million citizens. The Ukrainian Republic has 40.6 million inhabitants (capital Kiev). Kazakhstan has 8.5 million persons (capital: Alma Ata); White Russia has 8.0 million (capital: Minsk); Uzbekistan has 7.3 million (capital: Tashkent). Azerbaidzhan has 3.4 million inhabitants of whom almost a million are living in Baku. The *distribution of the population is very uneven* in the various parts of the country. The average individual has about one ninth of a square kilometer for himself. The densest is the population in the southern part of European Russia (25 men per sq.Km), especially at the industrial area of Moskva-Gorky and Jaroslav-Tula, also in Ukrainia in the Donec Basin. In Central Asia, the habitation is chiefly along the naturally and artificially irrigated strips of land (average 2 to 5 persons to a sq.Km). In Siberia and in the Far East the population has been growing during the last few years. The Trans-Siberian Railroad, which is about 7,416 Km long has a quite congested area along the railroad line (10-25 men per sq.Km). In Yakutia, the average population is 0.13 inhabitants per sq.Km, but the most sparse is the Chukch Peninsula where one person has almost 30-40 sq.Km for elbow room.

In the planned economy of the U.S.S.R., one of the goals is the development of the entire land. Hence, as the industry was pushed more and more toward the sites of the raw materials it was working with (i.e., toward the east), people also began to *migrate to the Urals* and to the Far East, and/or to Siberia. Almost two million left Europe (voluntarily?) and settled in Central Asia. The expansion of agriculture also required *migration of young people* to such states as Kazakhstan and Siberia.

Many ethnic minorities are living in the Soviet Union, more than 100 nations, tribes, and minor groups. Where these groups are in the majority, they are allowed to organize their own national republic, or territory or district. Numerically, the Russian nation is the largest in the U.S.S.R., making about 60% of the total population (or about 120 million Russians). They have spread now everywhere in the country from their original European area of living. This means that 90% of the Siberian population is now Russian. But even in the "Russian" republic more than 40 different ethnic minorities are found. The next largest national group of the U.S.S.R. is the Ukrainian nation (40 million), then the White Russians (8.7 million), the Uzbeks (5 million), Tartars (4.3 mil-

lion), Kazaks (3.1 million), etc. There are even Greeks, Bulgars, Kurds and Arabs in the Soviet Union.

Well! *How can the Soviet feed so many people?* Can they produce enough food and other products for comfortable living? And what about the future? Naturally, these are the big questions which the Soviet propaganda must answer. The Soviet denies, of course, that there can ever be an *overpopulation in a socialistic state.* Such evil can develop only in a capitalistic state, they say. They will be able to produce food, and dwelling, and clothing to the satisfaction of everybody because "science and technic are in the service of the people." In their words, poverty and shortcomings and hunger and famine are not inevitable and not the natural course of things; they are "the results of capitalism which will disappear together with the latter." More of this next month. . . . *Multa paucis!*

FIRST INSTITUTE ON VETERINARY PUBLIC HEALTH PRACTICE

(Meeting of Board of Editors, June 19, 1959, Ann Arbor, Michigan.)

(L. to R.) Dr. L. R. Davenport, Ill. State Health Dept.; Dr. Leonard M. Schuman, Univ. of Mich.; Dr. Donald B. Coohon, Mich. State Health Dept.; Mr. Harry E. Miller, Univ. of Mich., School of Public Health; Dr. H. J. Stafseth (Chairman), Mich. State Univ.; Dr. James Lieberman (Secretary), Communicable Disease Center, USPHS, Atlanta; Dr. R. J. Horton, Univ. of Mich., School of Public Health; Dr. Lloyd Neurauter, Office of The Surgeon General, U. S. Air Force, Washington; Dr. Martin D. Baum, Colo. State Health Dept.; Dr. Ernest J. Witte, Pa. State Health Dept.

NOTES

Timely items of general interest are accepted for these columns. Deadline is 1st of month preceding month of issue.

Department of Defense

Ass't Secretary (Health & Medical)—HON. FRANK B. BERRY, M.D.

Deputy Ass't Sec'y—HON. EDW. H. CUSHING, M.D.

INDUCTION

The Selective Service has been asked to call 9,000 for induction into the Army during October.

MEDICARE

Effective July 28, 1959, a wife who is eligible for civilian medical care under the "Medicare Program," whose husband dies while on active duty, and who is pregnant at the time of his death, may receive at Government expense from civilian sources obstetrical and maternity care to include care of the mother before delivery, delivery of the child, and that care of the mother after the birth normally associated with the birth of child. Also included is the authorized care of the newborn.

Army

Surgeon General—LT. GEN. LEONARD D. HEATON

Deputy Surg. Gen.—MAJ. GEN. THOMAS J. HARTFORD

THREE STAR GENERAL

Lieutenant General Leonard D. Heaton, Surgeon General of the Army, is the first Surgeon General to wear three stars. Sworn into office on June 1 of this year as Surgeon General, it was less than three months later that President Eisenhower nominated General Heaton for the rank of lieutenant general. The Army Medical Service can be justly proud that this distinguished surgeon has attained the rank that no other surgeon general has reached.

General Heaton, a native of West Virginia, is a graduate of the University of Louisville School of Medicine. Upon graduation he entered the Army Medical Corps. During his military career he has followed the specialty of surgery. He is a Fellow of the American College of Surgeons and a Diplomate of the American Board of Surgery.

VETERINARY CORPS CHIEF RETIRES

Brig. General Elmer W. Young who has been Chief of the Veterinary Division, Office of the Surgeon General, retired from military service on August 31. General Young, a native of Illinois, entered the Army in 1926 following his graduation from the Kansas State College of Agriculture and Applied Science. His present plans call for his continued residence in the Washington, D.C., area.

NEW VETERINARY CORPS CHIEF

Colonel Russell McNellis, VC, took the oath of office as Chief of the Veterinary Division, Office of the Surgeon General on September 1. He succeeds Brig. General Elmer W. Young who retired.

Colonel McNellis, a native of Iowa, received his doctor of veterinary medicine degree from the Iowa State College of A & M Arts in 1928. He was at that time commissioned in the Veterinary Corps of the Army. In 1933 he graduated from the Army

Veterinary School and the Medical Field Service School. He has been awarded the Legion of Merit decoration by the Army. Nomination for the rank of brigadier general has been made by President Eisenhower.

RETIRED

Major General Elbert DeCoursey, Medical Corps, who has been Commandant of the Army Medical Service School, Brooke Army Medical Center, retired on September 30 after 31 years' service in the Army.

General DeCoursey, one of the nation's foremost pathologists, will become Director of the Southwest Foundation for Research and Education, and Director of Scientific Research at Trinity University, as a full professor. He has established his residence at 114 Brandon Drive, West, San Antonio, Texas.

COLONEL MOWREY RETIRED

Colonel Fred H. Mowrey, MC, who had been Chief of Professional Services, Letterman Army Hospital, retired on July 31, to become Chief of the Medical Service, Los Angeles County Hospital.

At the retirement ceremonies Colonel Mowrey was presented with the Legion of Merit (First Oak Leaf Cluster) by Brig. General A. L. Tynes, Commanding General of Letterman Hospital. Colonel Mowrey was the recipient of the Hoff Medal (1936) for the top scholastic record at the Army Medical School.

CHIEF PROFESSIONAL SERVICE

Colonel James E. Graham, MC, assumed duties as Chief of Professional Services at Letterman Army Hospital on August 1. A native of Indiana and a graduate of the Indiana University Medical School (1930), he entered the Army in 1934. During World War II he served in the Mediterranean Theater as commander of various medical units in North Africa and Italy. He served a tour in the Office of the Surgeon General of the Army as Assistant Chief of Surgery Consultant. The present tour at Letterman Army Hospital as Chief of the Department of Surgery began in May 1957. This position he will continue to fill in addition to that as Chief of Professional Services.

SURGEON GENERAL'S MEDICAL MEETINGS

Four meetings featuring outstanding speakers from professional, industrial and political life will be held at the Walter Reed Army Medical Center, Washington, D.C. The meetings will be held at 8:00 p.m., at the Sternberg Auditorium on October 15, 1959, December 17, 1959, February 18, 1960, and April 21, 1960. Medical and allied personnel of all the Federal services, Reserve officers of all services, and civilians having an interest in the medical and allied fields are invited to attend these meetings.

CHIEF, OCCUPATIONAL THERAPIST

Lt. Colonel Cordelia Myers, AMSC, assumed the duties of Chief, Occupational Therapist Section and Assistant Chief, Army Medical Specialist Corps, on October 1. She succeeded Lt. Colonel Myra L. McDaniel, AMSC.

Colonel Myers has been Chief Occupational Therapist at Brooke Army Hospital, Fort Sam Houston, Texas. She is a graduate of the University of Kansas. In 1955 she was awarded a Master of Arts degree in occupational therapy at New York University.

ASSIGNMENTS SGO

Colonel Augustus J. D. Guenther, MSC, has been appointed Chief of the Enlisted Branch, Personnel and Training Division, Office of the Surgeon General. He replaces Lt. Colonel E. E. Martin, MSC, who has been assigned to the U.S. Army Hospital, Fort Gordon, Georgia.

Colonel Elwood M. Wright, MSC, has been appointed Executive Officer for the U.S. Army Medical Research and Development Command. Previous to this assignment he was Executive Officer to the Sixth Army Surgeon, San Francisco.

Lt. Colonel James M. Enmeier, DC, former Deputy Dental Surgeon of the Sixth Army, has been assigned to the Office of the

Surgeon General. He succeeds Colonel K. F. Ehrlich, DC, who has been assigned to the 98th General Hospital in Germany.

Lt. Colonel Louis E. Mudgett, MSC, has been named Executive Officer of the Professional Division, Office of the Surgeon General. He replaces Lt. Colonel William L. Austin, MSC, who has been assigned to the 97th General Hospital, Germany.

Colonel Mudgett who had been Executive Officer at Letterman Army Hospital is a graduate from the Army-Baylor course in Hospital Administration and holds an A.B. degree from San Francisco State College. He has had eleven years in hospital administration in various Public Health Service hospitals.

Lt. Colonel Robert D. Pillsbury, MC, has been assigned as head of the Professional Training Branch, Personnel and Training Division, Office of the Surgeon General. He is a Diplomate of the American Board of Surgery, and a recent graduate of the Command and General Staff College, Fort Leavenworth, Kansas.

Lt. Colonel Francis C. Nelson, MSC, has been appointed Chief of the Technical Liaison Office, Surgeon General's Office. He succeeds Major William V. Davis, MSC, who has been assigned as a student at the Army Medical Service School. Colonel Nelson held this same position from 1948-1952.

Lt. Colonel Robert E. Van Gilder, MSC, has been appointed as Chief of the Training Doctrine and Publications Branch, Personnel and Training Division, Surgeon General's Office. He comes to this position from Formosa.

Major Harriet A. Dawley, ANC, became Assistant Chief of the Army Nurse Corps on September 1. A graduate of the Metropolitan Hospital School of Nursing in New York City (1937), she entered the Army in 1941, and was assigned to the 210th General Hospital in the Panama Canal Zone. In 1951 she received her B.S. degree in Nursing Education from the University of Minnesota in Minneapolis. She has completed the requirements for a Master of Arts degree in Nursing Education with a major in Administration at Teachers College, Columbia University.

Major Mercedes M. Fischer, ANC, was recently appointed to head the Health Nursing Branch, Preventive Medicine Division. She succeeds Major Elizabeth A. Pagels, ANC, who has been assigned to the 540th General Dispensary in Germany as Army Health Nurse.

Major Rene C. Garza, MSC, has been assigned to the Personnel and Training Division, following an assignment at the Army Medical Service School.

Major Ervin L. Sanders, MSC, has been assigned the duties of Chief of the Classification and Assignment Section, Personnel and Training Division Office of the Surgeon General.

Major Clarence L. Siefert, MSC, has been assigned to the Office of the Surgeon General, in the office of Special Assistant for Reserve Affairs.

ASSISTANT COMMANDANT AMSS

Colonel Laurence A. Potter has been named Assistant Commandant of the Army Medical Service School at the Brooke Army Medical Center, Fort Sam Houston, Texas. The Center is commanded by Major General William E. Shambora.

After receiving his medical degree from the University of California in 1939, Colonel Potter entered the Army Medical Corps. During World War II he was Surgeon of the 7th Division which was engaged in the Attu Campaign in the Aleutians in May 1943. This campaign presented the Medical Service of the Army with many problems, chief of which were injuries due to the cold wet climate. Colonel Potter continued with the 7th Division in its later Pacific Theater campaigns and he became Surgeon of the XXIV Corps in the Asiatic-Pacific Theater of Operations.

Colonel Potter received his Master's degree in Public Health from Harvard in 1948. He has attended the regular course at the Army War College.

TO PLAN SYMPOSIUM

Major Hugh L. Keegan, MSC, entomologist in the Department of Preventive Medicine, Army Medical Service School, Brooke Army Medical Center, Fort Sam Houston, Texas, has been invited to plan and coordinate a symposium on poisonous plants and animals of the Pacific Ocean area.

The Tenth Pacific Science Congress sponsored by the G. W. Hooper Foundation at the University of California Medical Center, San Francisco, at which these topics will be discussed, will be held in Honolulu, August 21-September 9, 1961.

The papers will be edited by a group headed by Major Keegan and later will be published in book form.

U. S. Army Photo

(L. to R.) MAJ. GEN. WM. E. SHAMBORA; 2ND LTS. MARY COLE, CHRISTENE ELLIS, FRANCES IACOBONI, JANET JOLIN, ELAINE SCHULTZ, AND DONNA SCHREMPP.

GRADUATES OF DIETITIAN PROGRAM

The first six graduates of the Army Student Dietitian program recently arrived at the Army Medical Service School, Fort Sam Houston, Texas, for a basic military orientation course, and were sworn in as commissioned officers in the Army Medical Specialist Corps by Major General William E. Shambora, Brooke Army Medical Center Commander.

The Army Student Dietitian program which went into effect in 1957 provides financial assistance to outstanding students majoring in foods and nutrition or institutional management, which are prerequisites for becoming qualified dietitians. After completion of either sophomore or junior studies in accepted civilian colleges or universities, outstanding students may be enlisted in the Women's Army Corps Reserve and remain in school to complete their educational requirements. During this period they receive the base pay of a private, plus allowances for food and quarters, or a total in excess of $200.00 a month.

Students apply for commission in the Army Medical Specialist Corps and enter active duty after college graduation. They repay a year of military service for each 12 months of assistance while attending college. For 12 months or less in the student program, the obligatory tour is 24 months plus the one-year Army Dietetic Internship performed at either Brooke Army Hospital or Walter Reed Army Hospital in Washington, D.C. For student time up to 24 months, the required commissioned service would be 36 months plus the year of internship.

ASSIGNED TO HQ. SECOND ARMY

Colonel Edward J. Dehné, MC, who has been Commanding Officer of the Army Environmental Health Laboratory, was recently assigned to Headquarters, Second Army, Fort George G. Meade, Maryland.

Colonel Dehné is known for his work in preventive medicine and occupational medicine. He was certified as a member of the Founders Group in Occupational Medicine in 1955 and was previously certified in 1949 by the American Board of Preventive Medicine and Public Health.

COMMENDATION AWARD

Lt. Colonel Howard C. Maxey, VC, Commanding Officer of the Fifth U. S. Army Veterinary Food Inspection Service, was recently presented with the Army Commendation Award. Presentation was made by

U. S. Army Photo

COL. GEORGE E. LEONE, MC, presents Commendation Award to LT. COL. HOWARD C. MAXEY, VC.

the Surgeon, Fifth Army, Colonel George E. Leone.

Colonel Maxey, a graduate of Iowa State University in 1933, was cited for his outstanding performance of duty as Commanding Officer, Fifth U. S. Army Veterinary Food Inspection Service. In that capacity he has been responsible to the Fifth Army Veterinarian, Colonel William E. Jennings, for the inspection of all foods and sanitary inspections of all food processing establishments in the thirteen states in the north central region of the United States which comprise the Fifth U. S. Army Area.

TWINS AND ARMY COMMISSION

From Africa our attention was called to the fact that another set of twins besides the Starrett twins mentioned in the July issue of MILITARY MEDICINE had been commissioned in the Army together.

Major Glenn Burt, MC, now in Africa, called our attention to the fact that Elsie and Edna Nickel, Army Nurse Corps, took the oath of office for a commissioned officer together some years ago.

Advice received from Captain Elsie Nickel, ANC, now on duty at Brooke Army Medical Center is to the effect that she and her twin sister, Edna, had received the oath of office at the same time in 1951. Furthermore, they were honored by the presence of the then Surgeon General, Major General George E. Armstrong.

THE HISTORY OF THE U. S. ARMY MEDICAL SERVICE CORPS

The U. S. Army Medical Service Historical Unit in Washington, D.C., under the direction of The Surgeon General, is actively engaged in the preparation of the History of the U. S. Army Medical Service Corps.

The introductory chapter of this volume will depict by historical example and analogy, the background that led to the establishment of the former Sanitary, Medical Administrative, and Pharmacy Corps as well as the present day Medical Service Corps within the Army Medical Department and the Army Medical Service. Other chapters will be devoted to the discussion of the detailed organization, administrative aspects, and achievements of the Medical Service Corps and each of its progenitor corps.

Military documents of all descriptions, records or articles of professional and scientific significance, personal letters, and photographs which relate to the activities of the present Medical Service Corps and each of its predecessors are needed to highlight this history and to augment official references.

It will be greatly appreciated if individuals who possess such material would forward it directly to the:

Director
Historical Unit, USAMEDS
Forest Glen Section
Walter Reed Army Medical Center
Washington 12, D.C.

Any material forwarded to the Historical Unit will be returned to the owner after duplication of this material if that is his wish or the material will be retained and filed in the Historical Unit.

FIRE EXTINGUISHING LIQUID

"Monobromotrifluoromethane" is a new agent which has been developed by the Army for extinguishing liquid fuel and electrical

fires. It is considered twice as effective as any other liquid and can be used in temperatures as low as 65 degrees below zero. The liquid is non-toxic and non-corrosive and can be used safely in homes.

NEW FILM

"One Day's Poison" is a 30-minute film recently developed by the Army Medical Service as part of its Health Nursing Program, a program for the health education of dependents of Army personnel.

The film dramatizes the dangers to children from accidental consumption of various household substances such as cleaning fluids, polishes, kerosene, drugs and medicine.

Colonel Philip R. Beckjord, Army Surgeon General's Office, in stressing the importance of this film said: "It is not infectious disease but accidents, including poisoning, that are the important cause of death for children of one to 15 years of age."

Navy

Surgeon General—REAR ADM. BARTHOLOMEW W. HOGAN
Deputy Surgeon General—REAR ADM. EDWARD C. KENNEY

RADIATION EXPOSURE EVALUATION BUILDING

The construction of a new two-story Radiation Exposure Evaluation Building at the National Naval Medical Center, Bethesda, Maryland, is scheduled to start this fall.

The building, the first of its kind for military usage, will have 8,100 square feet of floor space and will contain four low background counting chambers and radioisotope facilities. In these, Navy personnel who are exposed to ionizing radiation can be thoroughly studied and evaluated by the most recent equipment. The counting chambers will be located on the first floor of the building. Four-inch thick steel plate will be used for radiation shielding.

The second floor of the building will contain laboratories, an emergency room, decontamination facilities, nurses' station and three quiet rooms.

RECEIVES AWARD

Lieutenant Commander J. E. Szakacz, MC, U. S. Navy, was recently awarded the Distinguished Service Plaque of the U. S. Junior Chamber of Commerce by the Bethesda, Maryland, Chapter.

Doctor Szakacz is a native of Hungary. He lived under the German and the Russian occupation, then went to Italy, learned the language, entered the Faculty of Medicine at the University of Rome where he earned his medical degree. He served his internship in Illinois and passed the State Board examination. He was commissioned in the Naval Medical Corps and has decided upon a career with the Navy. His research work with the use of pressor amines has gained much attention.

U. S. Navy Photo

LT. CDR. J. E. SZAKACZ, MC, USN

RETIRED

Recently retired from active naval service: Captain Raymond A. Lowry, DC; Commanders Thomas B. Britt and Lauren J. Smith, Medical Service Corps; and Lieu-

tenant Commanders W. J. Harter and Paul H. Hatfield, Medical Service Corps.

MEDICAL PROGRAMS

In Fiscal Year 1959 students chosen for the following medical programs were as follows: for the Ensign-1915 Program—315; for Senior Medical Student Program, 282 applied, 200 were selected; for Intern Program, 329 applied, 176 selected; and for Residency Training Program, 327 applied, 119 were selected.

NEW CORRESPONDENCE COURSE

"Oral Diagnosis" is a new correspondence extension course available to officers of the Dental Corps of the U. S. Navy and Naval Reserve. The course has ten assignments covering the philosophy of treatment planning, special methods of examination, special diagnosis of dental and oral diseases, and suggested treatment procedures.

Reserve dental officers may receive promotion and/or retirement points to be credited to the completion of course units.

PRESSURE SUIT FOR ASTRONAUTS

The Navy's newest aluminized full pressure omni-environmental suit was accepted for use by the Astronauts who are going to fly in Project Mercury. This suit was developed by the Air Crew Equipment Laboratory at Philadelphia under the direction of Naval Aviation Medicine personnel.

Air Force

Surgeon General—MAJ. GEN. OLIVER K. NIESS

Deputy Surg. Gen.—BRIG. GEN. JOHN K. CULLEN

DIRECTOR OF PROFESSIONAL SERVICES

Coloney Aubrey L. Jennings, USAF, MC, was recently appointed Director of Professional Services, Office of the Surgeon General.

Doctor Jennings, a native of Bartlett, Texas, received his medical degree from the University of Oklahoma in 1929, and was commissioned in the Regular Army Medical Corps in 1934. During World War II he was Surgeon of the Ninth Bomber Command in Europe. Later he became Chief of the Department of Ophthalmology at the School of Aviation Medicine. During the Korean Conflict he was Surgeon of the Far East Matériel Command. He transferred to the Department of the Air Force when it was established in 1949.

In the past several years he has been instrumental in developing the Air Force Clinic—a new concept in medical support for the military services. This system permits the limited number of Air Force Medical Service personnel to handle more than eleven million clinic visits a year by Air Force personnel and their dependents worldwide.

Colonel Jennings is General Chairman of the 66th Annual Convention of Military Surgeons of the United States which will be held in Washington, D.C., November 9-11, 1959.

GENERAL BYRNES RETIRES

Brigadier General Victor A. Byrnes, USAF, MC, retired on September 30, 1959, after thirty years of active military service.

Doctor Byrnes, was Director of Professional Services, Office of the Surgeon General, USAF, from 1955 until August 14, 1959, when he was appointed Special Assistant to the Surgeon General. In 1955 he received the Gorgas Award from the Association of Military Surgeons and the Legion of Merit from the U. S. Air Force for his research on retinal burns produced by atomic flash. In 1958, he received the Lilijencrantz Award from the Aero Medical Association for his basic research in ophthalmological problems pertaining to high-performance aircraft.

Doctor Byrnes will be affiliated with the Mound Park Hospital, St. Petersburg, Florida, as Director of Medical Education.

PHYSICIANS FOR REGULAR AIR FORCE

Applications from any eligible physician for the Regular Air Force will now be considered. For the past two years such ap-

plications had to be returned because of a lack of vacanies. This information should be of special interest to Reserve Medical Officers who graduated from medical school in 1955 or 1956 and whose previous applications were not favorably considered because of the limited number of positions. For further information contact the Office of the Surgeon General, U. S. Air Force, Washington 25, D.C.

LEGION OF MERIT

Colonel Theodore E. Fischer, USAF, DC, recently received the Legion of Merit. The presentation was made to him by General William H. Tunner, Commander, Military Air Transport Service, Scott Air Force Base, Illinois. Colonel Fischer is Command Dental Surgeon, MATS.

U. S. Air Force Photo

BRIG. GEN. L. R. BRASWELL, USAF, MC, MATS Command Surgeon, admires Legion of Merit worn by COL. FISCHER, USAF, DC.

Public Health Service

Surgeon General—LEROY E. BURNEY, M.D.
Deputy Surg. Gen.—JOHN D. PORTERFIELD, M.D.

LIVE POLIOVIRUS VACCINE

A report has recently been given to Surgeon General Leroy E. Burney, USPHS, on the present status of attenuated live poliovirus vaccines. Dr. Burney said, "If energetic efforts are continued to find answers to the remaining technical questions concerning safety, effectiveness and manufacturing procedures, one or more of the three vaccines now being proposed may be under production within one to two years. Meanwhile in the Salk vaccine there already is at hand a potent weapon whose value and effectiveness have been proved. I continue to urge all persons under 40 to complete their series of Salk injections so that no one will remain unprotected at the time of the next polio season."

The following is the status of the live poliovirus vaccine as reviewed by the Committee:

1. Three sets of attenuated polio virus strains have been proposed for use as oral vaccines. The Sabin strains have all had extensive field trials in Eastern Europe, Mexico, and Singapore; the Lederle strains have been widely used in Latin America; and the Koprowski Type I strain has been used in a large trial in the Belgian Congo. However, no significant amount of field information is available concerning Koprowski's Type II strain, and only limited information is available in relation to his Type III component.

2. There is considerable difference in the neurovirulence or damaging effect on nerve cells for monkeys of the three sets of strains as determined by intrathalamic (within the brain) and intraspinal inoculation. On this basis, the Sabin group has an advantage over the others, but none of these strains is completely nonvirulent when inoculated into monkeys by the intraspinal route.

3. No evidence has been reported to indicate that any of these vaccines produced any harm to the individuals to whom they were administered. The thoroughness with which the observations were made has varied in different studies.

4. In some studies the ability of these strains to multiply and thus produce antibodies is less than could be expected on theoretical grounds. Apparently a number of factors operate in the field which may prevent alimentary infection and the subsequent development of immunity.

5. A number of workers have reported that virus excreted by vaccinated individuals had shown increased neurovirulence for monkeys. There is considerable disagreement among investigators as to the significance of these reversions in virulence.

6. Field experience with any strain to date cannot be interpreted as affording reasonable proof that the community of nonvaccinated persons will be free of danger from possible reversion of virulence in excreted virus under a great variety of readily anticipated circumstances. This is one of the most important unresolved problems.

7. There is evidence which indicates that under some circumstances the simultaneous administration of all three types of virus may be effective.

Major problems which remain to be solved before definitive decisions can be made regarding licensing are reported by the Committee:

1. The significance of increased neurovirulence for monkeys of virus excreted by vaccinated individuals, as reported by a number of workers.

2. The demonstration of adequate measures of effectiveness of live poliovirus vaccines in field trials which, to be definitive, must involve large population groups. The capacity of the virus to spread among contacts means that in such a controlled field trial, some nonvaccinated controls will become infected and thus presumably become immune—a complicating factor in such a study.

3. The development of standards to determine the possible presence or absence of stray agents in the vaccine. Over 40 simian agents, including B-virus, have been encountered in the routine testing of killed poliovirus vaccine. These are derived from the monkey tissues used. Little is known of their pathogenicity for man, except B-virus and even here the minimum infecting dose is not known.

4. The establishment of carefully designed and evaluated studies to demonstrate the production of specific antibodies in 90 percent or more of inoculated susceptibles in order to assure the potency of such vaccines.

TRAINING IN EPIDEMIOLOGY

A course in Applied Epidemiology will be offered by the Communicable Disease Center, Public Health Service, at Denver, Colorado, November 16-20, 1959.

This course is designed primarily for physicians who serve as investigators of disease outbreaks or have administrative responsibility for such investigations. It serves both as a refresher course for the experienced health administrators and as an introductory course for physicians new to public health. Emphasis is placed on developing and understanding of how epidemiological techniques can be used in the approach to the solutions of problems in the preventable disease field. Lecture-discussion sessions, and audiovisual aids are used in the presentations. However, emphasis is placed on group participation which is obtained through the utilization of the group solution of epidemiological problems, seminar-type presentations, and panel discussions. Registrants will be expected to attend all sessions of the course.

Further information and application forms may be obtained from: Chief, Communicable Disease Center, Public Health Service, 50 Seventh Street, N.E., Atlanta 23, Georgia, Attention: Chief, Training Branch; or from: Public Health Service, Region VIII, First National Bank Building, Denver 2, Colorado.

CASES FOR STUDY

Sjögren's syndrome and malignant carcinoid cases are being sought for study by the National Institutes of Health, Bethesda, Maryland. Physicians who wish to transfer such cases to Bethesda are requested to contact Dr. Joseph J. Bunim in the cases of Sjögren's syndrome, and Dr. Charles G. Zubrod for the malignant carcinoid cases.

Sjögren's syndrome is characterized by "dryness of all mucous membranes resulting from deficient secretion of glands, particu-

larly the lacrimal and salivary glands, those of the upper respiratory tract, the sweat glands and the glands of the stomach" (Dorland).

Malignant carcinoid manifests itself by "flushing, asthma, diarrhea and valvular heart disease" (Cecil and Loeb *Textbook of Medicine*—Saunders).

HONORED

Dr. John W. Knutson, USPHS, was honored on October 5 when he was presented with The Henry Spenadel Award for his distinguished service to dentistry in the field of research and for his many years that have been dedicated to nation-wide and world-wide public health. Presentation was made at the First District Dental Society meeting in New York.

Dr. Knutson, a native of Minnesota, was commissioned in the Public Health Service after his graduation in dentistry in 1931. He has published many articles on dentistry and is a contributing editor to "Dentistry in Public Health."

ELECTED TO EXECUTIVE BOARD

Dietitian Director Edith A. Jones, Chief of the Nutrition Department, National Institutes of Health, Bethesda, Maryland, has been elected to the Executive Board of The American Dietetic Association. She will serve a one-year term of office as speaker of the House of Delegates.

Miss Jones is a member of the Executive Council of the Association of Military Surgeons of the United States. She was the recipient of the 1957 McLester Award presented by the Association for distinguished service in the field of nutrition and dietetics.

CHOLERA RESEARCH PROJECT

The United States has allocated $400,000 for a cholera research project from the President's Fund for Asian Economic Development, a part of Mutual Security appropriations. The money has been assigned to the National Institutes of Health which will in turn make further grants and contracts to carry out various phases of the project.

It is planned to establish a research laboratory in Southeast Asia. A team of six scientists headed by Dr. Joseph E. Smadel of the National Institutes of Health has been in the Far East and South Asia recently making a survey of the situation.

DR. GARFIELD RETIRES

Dr. Stanton Garfield, grandson of James A. Garfield, 20th President of the United States, retired from the U. S. Public Health Service on September 1. He leaves the Service at the mandatory retirement age of 64.

Dr. Garfield at the time of his retirement was Fellowship Program Director and Training Officer, Division of International Health, Public Health Service. He maintains his residence at 3343 Reservoir Road, N.W., Washington, D.C.

RETIRED

The following Commissioned Officers of the Public Health Service have been retired: *Medical Directors* Lester R. Nagel and Edwin G. Williams; *Dental Director* Thomas L. Hagen; *Sanitarian Director* Travis E. McNeel; *Senior Surgeon* Charles L. Newberry; *Senior Nurse Officer* Lillian A. Gardiner; and *Nurse Officer* Elizabeth C. Caczko.

Medical, Dental, and Sanitarian Directors have the equivalent rank to Navy Captain; Senior Surgeon and Senior Nurse is equivalent to Navy Commander; Nurse Officer is equivalent to Navy Lieutenant Commander.

Veterans Administration

Chief Medical Director—WILLIAM S. MIDDLETON, M.D.

Deputy Chief Med. Dir.—R. A. WOLFORD, M.D.

THE AGING VETERAN

The Administrator of Veterans Affairs, Sumner G. Whittier, has pointed to problems

of the aging veteran. The problems are identical with those faced by the nation according to Mr. Whittier. He states:

"These are more than medical problems—they are social and economic problems as well —and they are intensified in the Veterans Administration because of the age of the veteran population.

"The average age of World War I veterans now is 65 years and the average age of World War II veterans is 40 years. The average age of veterans receiving VA medical care, 51 years, already shows the predominance of the elderly.

"But the real peak in numbers will come with aging of World War II veterans. Today, of the 22 million veterans, about six million are over 45. In 12 years, there will be only six million under that age.

"The direct responsibility the VA bears for care of this aging veteran population creates an opportunity for development of solutions that should be capable of translation into approaches and methods applicable to the general population.

"The solutions lie to a large extent in eliminating the concepts of rocking chair retirement and old folks homes. A positive approach of integrating senior citizens into the community life—not segregating them —is needed."

MENTAL HOSPITALS

The "open-door" treatment of mental patients has been adopted where possible for these patients. Granting of the maximum practicable amount of personal freedom is a major factor in the rehabilitation of psychiatric patients according to Dr. Jesse F. Casey, Director of the Psychiatry and Neurology Service, Veterans Administration.

To encourage mental patients to lead as normal lives as possible, some 20,000 patients are treated each month at VA mental hygiene clinics instead of being hospitalized and more than 65 VA general medical and surgical hospitals have sections for short-term treatment of psychiatric patients.

Miscellaneous Notes

AMBASSADOR PRESENTS CERTIFICATE

United States Ambassador to Nicaragua, Thomas E. Whelan recently presented a certificate of membership in the Association of Military Surgeons of the United States to Colonel Egberto Bermudez, Army of Nicaragua. The presentation was made in Managua.

Colonel Bermudez was one of the many international delegates present at the 65th Annual Convention of the Association of Military Surgeons which was held in Washington, D.C., November 17-19, 1958.

(L. to R.): AMBASSADOR WHELAN, COLONEL BERMUDEZ, COLONEL M. S. COMELLA, USA; LT. COL. H. PARKER, USA.

FEDERAL RADIATION COUNCIL

The Federal Radiation Council was established by President Eisenhower on August 14, and on August 22 the Secretary of Health, Education, and Welfare, Arthur S. Flemming, was named as chairman of that council.

The August 22 press release from The White House also stated: "The President also directed that the Department of Health, Education, and Welfare intensify its radiological health efforts and have primary responsibility within the executive branch for the collation, analysis, and interpretation of

data on environmental radiation levels such as natural background, radiography, medical and industrial use of isotopes and X-rays, and fall-out, so that the Secretary of Health, Education, and Welfare may advise the President and the general public."

SILICONE RESEARCH

The Dow Corning Center for Aid to Medical Research has been established at Midland, Michigan, to serve the medical profession on a non-profit basis by:

(a) providing technical aid in the use of silicones in medicine and surgery;
(b) acting as a clearing house for information about medical uses of silicones;
(c) cooperating in research in organosilicon chemistry in relation to the human body.

Dr. Rob Roy McGregor, one of the pioneer research workers in organosilicon chemistry is Director of the Center. Correspondence regarding research matters in silicones is invited.

HOME FOR EASIER LIVING

A "Functional Home for Easier Living" is being constructed on the grounds of the Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center.

This one level house, designed for the physically disabled, the cardiac and the elderly, will consist of two bedrooms, living room, dining area, kitchen, bathroom and carport.

A brochure called "A Functional Home for Easier Living" may be obtained from the Institute of Physical Medicine and Rehabilitation, 400 East 34th St., New York 16, N.Y.

FELLOWSHIPS

Persons interested in tuberculosis and respiratory diseases are eligible for two types of fellowships: (1) National Tuberculosis Fellowships for M.D.'s, Ph.D.'s, or Sc.D.'s, interested in research or teaching; and (2) Edward Livingston Trudeau Fellowships for specially qualified M.D.'s, who are assured of continued teaching or research appointments.

Deadline for applications is December 1. Address: The Director of Medical Education, American Trudeau Society, 1790 Broadway, New York 19, N.Y.

Special Fellowships in Industrial Medicine (1960-1961), Atomic Energy Commission, are open to men and women physicians interested in the atomic energy industry. Stipend during Fellowship or the academic year is $5,000 with additional amounts for dependents. Address inquiries to: A.E.C. Fellowships in Industrial Medicine, Atomic Energy Project, University of Rochester, School of Medicine and Dentistry, Rochester 20, New York, Attn.—Dr. Henry A. Blair.

MEETING

The American College of Allergists Graduate Instructional Course and Annual Congress will be held February 28 to March 4, *1960*, at the Americana Hotel, Bal Harbour, Miami Beach, Florida. For information contact John D. Gillaspie, M.D., Treasurer, 2049 Broadway, Boulder, Colo.

OCCUPATIONAL HEALTH CONGRESS

The 13th International Congress on Occupational Health will be held in New York City, July 25-29, *1960*. Persons desiring to present a paper should contact the Program Chairman: Dr. Irving R. Tabershaw, 375 Park Ave., New York, N.Y.

CANCER CONFERENCE

The Fourth National Cancer Conference sponsored by the American Cancer Society, Inc., and the National Cancer Institute will be held in Minneapolis, Minnesota, September 13-15, *1960*. For further information write: Medical Affairs Dept., American Cancer Society, 521 West 57th St., New York 19, N.Y.

SAVINGS AND LOAN DEPOSITS

Money placed in a building and loan association should be secured by that associa-

tion through the Federal Savings and Loan Insurance. It would be well for persons who have money on deposit in building and loan associations to check on this point. For your protection insist on FSLIC.

ATOMIC ENERGY BOOKS

Progress in Atomic Energy is Volume 1 of the 32 volume series on matters relating to atomic energy which will be published by the United Nations. Volume 1, now ready, contains 525 pages, 218 illustrations and 162 charts and graphs; price $12.50. These volumes should be ordered from the United Nations, Sales and Circulation Section, New York, N.Y.

MATURITY

A person remains immature, whatever his age, as long as he thinks of himself as an exception to the human race.—Harry A. Overstreet, *Think.*

PSYCHIATRY

"How do you know you're Napoleon?" the hospital attendant asked.

"God himself told me," the patient answered.

Said a voice from the next bed, "I did not!"—*Bruce Mag,* E. L. Bruce Co.

Honor Roll

Since the publication of our last, the following sponsored one or more applicants for membership in the Association:

Col. John H. Kuitert, MC, USA
Lt. Gene P. Meyers, (DC) USNR-R
Med. Dir. C. Dudley Miller, USPHS
Maj. Harriet A. Dawley, ANC, USA
Capt. Allen Goldman, DC, USA
Maj. Grover C. Kistler, MSC, USA
LCdr. D. L. McCord, MC, USN

New Members

Lt. George H. Mertz, MC, USNR
1st Lt. Billy D. Pierce, USAF-R (MC)
Capt. Robert J. Nejdl, MC, Iowa Air NG
Maj. Alexander Klier, USAF-R (DC)
Sr. N O Mary L. Mills, USPHS-R
Col. Edward G. Sion, MC, USA
1st Lt. Byron H. Peterson, MSC, USAF
San. Eng. Russell B. Woelz, USPHS
Isidore S. Meyer, M.D.
Capt. John T. Rogers, USAF-R (MC)
Lt. Col. Bernard Lawrence Friedman, USAF-R (DC)
CWO Curtis A. Bartholomew, USAR
Lt. Col. Earl L. Laird, USAF-R (MC)
Capt. William G. Mays, USAF-R (MC)
Lt. John W. Hauzenblass, MC, USN
Sr. Surg. R. W. O'Gorman, USPHS(R) (Inact.)
Capt. George T. Hill, USAR
Surg. Chester James Semel, USPHS-R
Maj. Janice A. Mendelson, MC, USA
1st Lt. Eugene J. Roszko, USAF-R (VC)
Surg. S. Samuel Tropea, USPHS-R
1st Lt. Peter F. Nowosielski, MC, USAF-R
Robert N. Price, D.D.S.
Surg. James H. McGee, USPHS
Capt. Wm. W. Schock, MC, USAF-R
Maj. Alfred R. Rios, MSC, USAF-R
Maj. Benjamin N. Saltzman, MC, USAF-R
Maj. Marian A. Tierney, ANC
Capt. Anna Marie Rider, NC, USAF-R
Capt. Mary E. Manis, NC, USAF-R
Lt. Col. Wilbur D. Dice, MC, USA
Capt. Joseph F. Bochetto, MC, AUS
Sr. Asst. Surg. Roy J. Thurn, USPHS
Lt. Col. Kenneth C. Ray, DC, USAF-R
Wendell A. Parker, M.D.
Lt. Marguerite Joan Racek, NC, USN
Maj. Richard K. Purpus, MSC, USAF-R
NO Laura M. Kelly, USPHS
Sr. Asst. Surg. Philip R. B. McMaster, USPHS
Vernor Floyd Lovett, M.D.
Major William J. Marias, DC, USAF-R
Capt. Henry D. Rosin, USAF-R (MC)
Lt. (jg) Barbara A. Taylor, USNR
Sr. Surg. James D. Tovey, USPHS
Lt. Col. Joseph J. Scull, Jr., DC, USAFR
Capt. Clifton L. Dance, Jr., MC, USAF
Capt. Wendell S. Johnson, DC, USA
Lt. Edward L. Pinney, Jr., MC, USNR

Lt. Col. Harry Shore, DC, USAF
Capt. W. W. Plummer, USAF-R (DC)
Stewart E. Gilbert, M.D.
Brig. Gen. John K. Cullen, USAF (MC)
Maj. Helen L. McCarthy, ANC, USAR
Lt. Col. George E. Rabinowitz, USAF-R (MC)
1st Lt. Emerson D. Shelley, DC, USAF
Lt. Col. W. M. Routon, USAF-R (MC)

Deaths

BRAZDA, Adolph W., Lieutenant Colonel, U. S. Air Force Reserve Medical Corps., Retired, died May 20 at Ranger, Texas, at the age of 60.

Doctor Brazda was a graduate of Emory University School of Medicine (1929). During World War II he served in the African and European Theaters. He was a Fellow of the International Academy of Proctology and in 1958 received the "Certificate of Merit," and international award for the outstanding paper.

KREMERS, Edward D., Lieutenant Colonel, Medical Corps, U. S. Army, Retired, died June 23 at the age of 77.

Doctor Kremers, a native of Michigan, received his medical degree from the University of Michigan in 1903. He was commissioned in the Medical Corps of the Army in 1910, and was retired for reasons of physical disability in 1922. He was a member of the Forty Year Club of the Association of Military Surgeons of the United States.

Doctor Kremers is survived by his widow, 2125 Mar Vista Avenue, Altadena, California.

RAINES, George N., Captain, U. S. Navy, Medical Corps, Retired, died at the U. S. Naval Hospital, Bethesda, Maryland, September 17, at the age of 51.

Doctor Raines, an eminent psychiatrist, was in active naval service from 1930 until his retirement in 1959. A native of Jackson, Miss., and a graduate of the University of Mississippi, he received his medical degree from Northwestern University. He served in many important positions in the psychiatric field, two of which were Chief of Psychiatry and Neurology for the Department of the Navy, and Chairman of Psychiatry at the Georgetown University Medical School, Washington, D.C. He was recognized as an authority on depression and suicide.

He is survived by his wife, 3730 Fordham Road, N.W., Washington, D.C., a daughter and a son.

Interment was in Arlington National Cemetery.

NEW BOOKS

Books may be ordered through this association.

Color Atlas and Management of Vascular Disease, William T. Foley, M.D., F.A.C.P. and Irving S. Wright, M.D., F.A.C.P., Appleton-Century-Crofts, Inc., New York, N.Y. Price $18.00.

Synopsis of Ophthalmology, William H. Havener, B.A., M.D., M.S. (Ophth.), C. V. Mosby Company, St. Louis, Mo. Price $6.75.

The Surgeon and the Child, Willis J. Potts, M.D., W. B. Saunders Co., Philadelphia, Pa. Price $7.50.

Clinical Coordination of Anatomy and Physiology, Martha Pitel, Ph.D., R.N., and Mildred Schellig, M.D., Springer Publishing Co., Inc., New York, N.Y. Price $5.50.

Drinking Problem and Its Control. Based on Experience in Du Pont Company, Gulf Publishing Co., Houston, Tex.

A Synopsis of Anaesthesia, J. Alfred Lee, M.R.C.S., L.R.C.P., M.M.S.A., F.F.A.R.C.S., D.A., Williams and Wilkins Co., Baltimore, Md. Price $6.50.

A Synopsis of Skin Diseases, Bethel Solomons, Jun., M.A., M.D., F.R.C.P.I., Williams and Wilkins Co., Baltimore, Md. Price $6.75.

Clark's Applied Pharmacology, Andrew Wilson, M.D., Ph.D., F.R.F.P.S., and H. O. Schild, M.D., Ph.D., D.Sc., Little, Brown & Co., Boston, Mass. Price $10.00.

The Care of Minor Hand Injuries, Adrian E. Flatt, M.A., M.D., F.R.C.S., C. V. Mosby Co., St. Louis, Mo. Price $9.50.

The Kinetics of Cellular Proliferation, Edited by Frederick Stohlman, Jr., M.D., Grune & Stratton, Inc., New York, N.Y. Price $5.75.

Synopsis of Ear, Nose and Throat Diseases, Robert E. Ryan, B.S., M.D., M.S. (ALR), F.A.C.S., William C. Thornell, A.B., B.M., M.D., M.S. (ALR), F.A.C.S., Hans von Leden, M.D., F.A.C.S., F.I.C.S.. C. V. Mosby Co., St. Louis, Mo. Price $6.75.

A Digest of New Developments in Army Weapons, Tactics, Organization, and Equipment, Maj. Marvin L. Worley, Jr., USA, The Stackpole Co., Harrisburg, Pa. Price $3.95.

The Joint and Combined Staff Officer's Manual, Col Jack D. Nicholas, USAF, Col. George B. Pickett, USA, Capt. William O. Spears, Jr., USN, The Stackpole Co., Harrisburg, Pa. Price $4.50.

The Eye: A Clinical and Basic Science Book, E. Howard Bedrossian, B.S., M.D., M.Sc. (MED.), F.A.C.S., Charles C Thomas, Publisher, Springfield, Ill. Price $11.00.

American Handbook of Psychiatry, Edited by Silvano Arieli, M.D., Basic Books, Inc., New York, N.Y. Price $25.00.

PROGRAM

66TH ANNUAL CONVENTION
ASSOCIATION OF MILITARY SURGEONS
OF THE UNITED STATES
Mayflower Hotel
Washington, D.C.
November 9, 10, and 11, 1959

THEME—"THE PRACTICE OF MILITARY MEDICINE—BROADENING CONCEPTS"

Everyone Invited—No Registration Fee
Reserve Retirement Credit Points

MAJOR GENERAL H. H. TWITCHELL, USAF, MC, PRESIDENT

SUNDAY, NOVEMBER 8

1:00-5:00 P.M.—*The Registration Desk will be open for those who may wish to register before the Convention opens.*

MONDAY, NOVEMBER 9

8:30-9:00 A.M.—*Band Concert*

9:00-10:00—*Opening Ceremonies*

10:00-12:00—*Panel of Chiefs of Federal Medical Services*

Dr. Frank Berry, Assistant Secretary of Defense (Health and Medical)

Lt. Gen. Leonard D. Heaton, Surgeon General of the Army

Rear Admiral Bartholomew W. Hogan, Surgeon General of the Navy

Maj. Gen. Oliver K. Niess, Surgeon General of the Air Force

Dr. Leroy E. Burney, Surgeon General of the Public Health Service

Dr. William S. Middleton, Chief Medical Director of the Veterans Administration

12:00 NOON—*Lunch*

1:15-1:45 P.M.—*Business Meeting of the Association*

2:00-2:30—*The Sustaining Membership Lecture*

Austin Smith, M.D., President, Pharmaceutical Manufacturers Association

2:30-3:15 P.M.—*Break to visit exhibits*

3:15-3:35—*Knowledge of Newer Respiratory Viruses*

Robert M. Chanock, M.D., USPHS, Laboratory of Infectious Diseases, National Institutes of Health, Bethesda, Maryland

3:35-3:55—*Present and Future Problems in VD Control*

William J. Brown, M.D., Chief, VD Branch, Communicable Disease Center, USPHS, Atlanta, Georgia

3:55-4:15—*The Danger of Folic Acid in Multivitamin Preparations*

Lt. Colonel William H. Crosby, MC, USA, Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D.C.

TUESDAY, NOVEMBER 10

9:00-10:00 A.M.—*The William C. Porter Lecture—"Trends in Mental Health"*

Paul H. Hoch, M.D., Commissioner of Mental Hygiene, State of New York

10:00-10:20—*Break to visit exhibits*

10:20-10:40—*Current Trends in the Indications for Surgery in Peptic Ulcer*

R. W. Postlethwait, M.D., Surgical Service, Veterans Administration Hospital, Durham, North Carolina

10:40-11:00—*Changing Concepts of Nutrition Following Subtotal Gastrectomy*

John M. Rumball, M.D., Director, Medical Service, Department of Medicine and Surgery, Veterans Administration, Washington, D.C.

11:00-11:30—*Ceremany to Honor International Delegates*

12:30—*International Luncheon*

Speaker: General Sir Robert Mansergh, United Kingdom

2:00-4:00 P.M.—*Closed Circuit Color Television Program*

(Originating from Andrews Air Force Base, Washington, D.C.)

Introduction, MAJ. GEN. NIESS, MAJ. GEN. TWITCHELL, COL. JENNINGS

The Air Force Clinic—Andrews Air Force Base

Epidemiological Laboratory—Lackland Air Force Base

School of Aviation Medicine—Brooks Air Force Base

Armed Forces Institute of Pathology, Washing, D.C.

Cape Canaveral—Patrick Air Force Base

WEDNESDAY, NOVEMBER 11

9:00-9:20 A.M.—*The Tissue Bank—* Present and Future

Captain George W. Hyatt, MC, USN, Director, Tissue Bank Department, U. S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland

9:20-9:40—*Medical and Surgical Aspects of Open Cardiac Surgery*

Brig. Gen. Clinton S. Lyter, MC, USA, Commanding General, William Beaumont Army Hospital, El Paso, Texas

and

Major Per H. Langsjoen, MC, USA, Chief, Cardiovascular Service, William Beaumont Army Hospital, El Paso, Texas

9:40-10:00—*Selective Malfunctioning of the Human Machine*

Lt. Colonel Douglas Lindsey, MC, USA, Director of Medical Research, U. S. Army Chemical Warfare Laboratories, Army Chemical Center, Maryland.

10:00-10:20—*Three Years Experience with Intensive Treatment and Recovery Unit in Medicine and Surgery*

Captain Lewis L. Haynes, MC, USN, Chief of Surgery, U. S. Naval Hospital, Chelsea, Mass.

10:20-10:40—*Break to Visit Exhibits*

10:40-11:00—*The Use of Radioisotopes in Medical Practice*

Captain E. R. King, MC, USN, Director, Department of Nuclear Medicine, U. S. Naval Hospital, National Naval Medical Center, Bethesda, Maryland

11:00-11:20—*Use of Fluorescent Antibody Technics in Hospital Practice*

Ralph B. Hogan, M.D., Chief, Laboratory Branch, Communicable Disease Center, Department of Health, Education, and Welfare, U. S. Public Health Service, Atlanta, Georgia

11:20-11:40—*Drug Therapy in Hypertension*

Edward D. Freis, M.D., Chief, Medical Service, Veterans Administration Hospital, Washington, D.C.

11:40-12:00—*The Use and Abuse of Drugs*

Arthur Grollman, M.D., Consultant to the U. S. Air Force; Chairman, Department of Experimental Medicine, Southwestern Medical School, University of Texas, Dallas, Texas

12:00—*Lunch*

2:00-4:00—*Closed Circuit Color Television Program*

(Originating from Andrews Air Force Base, Washington, D.C.)

Air Force Missile Development Center, Holloman Air Force Base, New Mexico

Navy Medicine—The Navy Flight Surgeon Arctic Aeromedical Laboratory, Aeromedical Laboratory

Wednesday Evening, November 11

HONORS NIGHT DINNER

PRESENTATION OF AWARDS

The Sir Henry Wellcome Medal and Prize

The Gorgas Medal

The Major Louis Livingston Seaman Prize

The Stitt Award

The McLester Award

The Sustaining Membership Award

The Andrew Craigie Award

The Founder's Medal

Followed by Dancing

SECTION MEETINGS

MONDAY, NOVEMBER 9

Pharmacy

Presiding: LIEUTENANT COMMANDER SOLOMON C. PFLAG, MSC, USN, Pharmacy Consultant, Bureau of Medicine and Surgery, Department of the Navy, Washington, D.C.

1:00 P.M.—*Guest Speaker*

Captain George Hyatt, MC, USN, Naval Medical School, National Naval Medical Center, Bethesda, Maryland

Medical Service Corps

Presiding: COLONEL LEONARD P. ZAGELOW, USAF, MSC, Chief, Medical Service Corps, Office of the Surgeon General, Department of the Air Force, Washington, D.C.

2:00 P.M.—IMPACT OF RADIOLOGICAL FALLOUT ON MEDICAL OPERATIONS

Colonel Roy D. Maxwell, MSC, USA, Chief, Medical Service Corps, Office of the Surgeon General, Department of the Army, Washington, D.C.

A REALISTIC APPROACH TO RADIATION EXPOSURE

(MPD—Minimum Possible Dose)

Commander Gordon C. Bell, MSC, USN, Radiological Safety Branch, Special Weapons Defense Division, Bureau of Medicine and Surgery, Department of the Navy, Washington, D.C.

NEW CONCEPTS FOR THE PROGRAMMING AND DESIGN OF BASE MEDICAL FACILITIES

Colonel Jack C. Carmichael, USAF, MSC, Chief, Facilities Division, Office of the Surgeon General, Department of the Air Force, Washington, D.C.

FACTORS INFLUENCING DRUG COSTS

Pharmacist Director Allen J. Brands, Chief, Pharmacy Branch, Division of Indian Health, U. S. Public Health Service, Washington, D.C.

Nurses

Symposium—"Ten Years of Progress—Where Will We Go From Here?"

Presiding: COMMANDER MARY C. GRIMES, NC, USNR, Head, Nurse Corps Reserve Liaison Branch, Bureau of Medicine and Surgery, Department of the Navy, Washington, D.C.

1:00 P.M.—GREETINGS

Captain Ruth A. Houghton, NC, USN, Director, Nursing Division, Bureau of Medicine and Surgery, Department of the Navy, Washington, D.C.

1:20—SKIT ON TEAM PLANNING FOR PATIENT CARE

Miss Margaret Howard, Team Leader
Miss Ruth G. Fortney
Miss Margaret M. Meagher
Mr. John F. Adams

1:40—PROGRESSIVE PATIENT CARE—A CHALLENGE FOR NURSING

Miss Faye G. Abdellah, R.N., Ed.D.

2:20 P.M.—NURSING CARE OF THE PATIENT WITH OPEN HEART SURGERY

Major Virginia M. Wickensheimer, ANC
Captain Elizabeth MacGarvie, ANC

3:00—BREAK

3:15—IMPROVING TEACHING METHODS, PROVIDES BETTER PATIENT CARE

Lieutenant Hope McIntyre, NC, USNR

3:45—AIR FORCE NURSES PROGRESS TOWARD THE SPACE AGE

LT. COLONEL LUCILLE C. SLATTERY, USAF, NC

Veterinary

Presiding: COLONEL ROBERT R. MILLER, USAF, VC, Assistant for Veterinary Services, Office of the Surgeon General, Department of the Air Force, Washington, D.C.

2:00 P.M.—SELECTION AND UTILIZATION OF ANIMALS IN SPACE RESEARCH

Captain George D. Smith, USAF, VC

AN EXPERIMENTAL APPROACH TO INFECTIOUS DISEASES IN VETERINARY MEDICINE

Lt. Colonel William S. Gochenour, Jr., VC, USA
Colonel Robert H. Yager, VC, USA
Lt. Colonel Chester A. Gleiser, VC, USA

BIOMEDICAL ASPECTS OF NUCLEAR POWERED AIRCRAFT
Lt. Colonel Charles M. Barnes, USAF, VC

FEDERAL FOOD AND DRUG LEGISLATION—ITS SIGNIFICANCE TO VETERINARIANS
Dr. Fred J. Kingma, Food and Drug Administration, Department of Health, Education, and Welfare, Washington, D.C.

TUESDAY, NOVEMBER 10

Medical Specialist Corps
Program to be announced.

Sanitary Engineers
Program to be announced.

WEDNESDAY, NOVEMBER 11

Dental
Presiding: BRIG. GEN. LEIGH C. FAIRBANK, USA, RET.

9:00 A.M.—TIME AND MOTION STUDIES AS RELATED TO DENTAL PRACTICE
John A. Anderson, DDS, Chicago, Illinois

Sustaining Members
Program to be announced.

SCHEDULE OF EVENTS FOR LADIES

MONDAY, NOVEMBER 9

8:30 A.M.—2:30 P.M.—REGISTRATION, MAYFLOWER HOTEL
2:30 P.M.—TOUR FOLLOWED BY TEA

TUESDAY, NOVEMBER 10

9:00 A.M.—WHITE HOUSE TOUR AND ARMED FORCES INSTITUTE OF PATHOLOGY TOUR

Transportation will leave Mayflower Hotel—DeSales Street Entrance—for *White House* at 9:00 A.M. At 10:30 A.M. transportation will leave *White House* for Armed Forces Institute of Pathology, Walter Reed Army Medical Center. At 12:00 noon transportation will leave Armed Forces Institute of Pathology for the National Naval Medical Center, Bethesda, Maryland, for *Ladies Luncheon* with Fashion Show by Jelleff's Washington, D.C. Return transportation for the Mayflower Hotel will leave the National Naval Medical Center at 3:30 P.M.

WEDNESDAY, NOVEMBER 11

9:00 A.M.—TOUR OF WAX MUSEUM AND NATIONAL GALLERY OF ART

Transportation will leave Mayflower Hotel—DeSales Street Entrance—at 9:00 A.M. for Wax Museum. At 10:30 A.M. transportation will leave *National Wax Museum* for the *National Gallery of Art.* Luncheon at *National Gallery of Art.* Transportation for return to Mayflower Hotel at 1:30 P.M.

SCIENTIFIC EXHIBITS

ARMED FORCES INSTITUTE OF PATHOLOGY

Exhibit: "Glycogen in Thyroid and Parathyroid Tumors" (Preliminary Study)
Exhibitor: G. H. Clinck, M.D.
Exhibit: "Medicolegal Autopsy" (Poisons)
Exhibitors: Maj. Edward H. Johnston, MC, USA—Russell S. Fisher, M.D.
Exhibit: "Pulmonary Alveolar Proteinosis—A New Entity"
Exhibitors: Samuel H. Rosen, M.D., Averill A. Liebow, M.D., Benjamin Castleman, M.D.

ARMY

Exhibit: "The Intestinal Biopsy Capsule"
Exhibitors: Lt. Col. William H. Crosby, MC, USA, Maj. C. E. Butterworth, Jr., MC, USA, Maj. Robert W. Smith, MC, USA, Col. Benjamin H. Sullivan, MC, USA
Exhibit: "A Contribution to Medicine—History of Medical Dept., U. S. Army in W.W. II"
Exhibitor: Col. John B. Coates, Jr., MC, USA
Exhibit: "The Microscopic and Chemical Pathology of Collagen Defect in Experimetal Scurvy"
Exhibitors: Erving F. Geever, M.D., Harold L. Upjohn, M.D., Stanley M. Levenson, M.D.

NAVY

Exhibit: "Bone Marrow Biopsy Using the Vim-Silverman Needle"
Exhibitor: CDR W. McFarland, MC, USN
Exhibit: "Clinical Radioisotope Studies of the Gastrointestinal Tract"
Exhibitor: Capt. E. R. King, MC, USN
Exhibit: "Nuclear Nursing"
Exhibitor: LCDR Lenore Simon, NC, USN

AIR FORCE

Exhibit: "Aerosinusitis in the Jet Age"
Exhibitor: Lt. Col. Francis E. Foley, USAF (MC)
Exhibit: "Activities of USAF Epidemiological Laboratory"
Exhibitors: Col. Thaddeus V. Domnanski, USAF (MSC), Capt. David F. Hersey, USAF (MSC)

PUBLIC HEALTH SERVICE

Exhibit: "Effects of Hypothermia on Experimental Brain Lesions"
Exhibitor: Edward J. Laskowski, M.D.

VETERANS ADMINISTRATION

Exhibit: "Coccidioidomycosis"
Exhibitor: Edward J. Dunner, M.D.
Exhibit: "Pneumoconioses"
Exhibitor: James W. Raleigh, M.D.

TECHNICAL EXHIBITORS

Abbott Laboratories, North Chicago, Ill.
(Booth 1)

Air-Shields, Inc., Hatboro, Pa.
(Booth 32)

American Cyanamid Company, Surgical Products Div., Danbury, Conn.
(Booth 58)

American Sterilizer Company, Erie, Pa.
(Booth 37)

Ames Company, Inc., Elkhart, Ind.
(Booth 56)

Astra Pharmaceutical Products, Inc., Worcester, Mass.
(Booth 40)

Ayerst Laboratories, New York, N.Y.
(Booth 53)

Baxter Laboratories, Inc., Morton Grove, Ill.
(Booths 43 & 44)

Becton, Dickinson and Company, (Bard-Parker), Rutherford, N.J.
(Booth 22)

Benton Laboratories, Hatboro, Pa.
(Booth 4)

Burroughs Wellcome & Co. (U.S.A.) Inc., Tuckahoe, N.Y.
(Booth 50)

Cameron Surgical Instruments Company, Chicago, Ill.
(Booth 19)

Chesebrough-Pond's, Inc., New York, N.Y.
(Booth 35)

Chilean Iodine Educational Bureau, Inc., New York, N.Y.
(Booth 17)

Ciba Pharmaceutical Products, Inc., Summit, N.J.
(Booth 49)

The Coca-Cola Company, Atlanta, Ga.
(Special area)

Cutter Laboratories, Teterboro, N.J.
(Booth 18)

Desitin Chemical Co., Providence, R.I.
(Booth 55)

Doho Chemical Corporation, New York, N.Y.
(Booth 30)

Eaton Laboratories, Norwich, N.Y.
(Booth 21)

Fenwal Laboratories, Somerville, N.J.
(Booth 31)

C. B. Fleet Co., Inc., Lynchburg, Va.
(Booth 12)

E. Fougera & Company, Inc., Hicksville, N.Y.
(Booth 15)

Geigy Pharmaceuticals, Yonkers, N.Y.
(Booth 41)

Hollister Incorporated, Chicago, Ill.
(Booth 46)

Industrial Acoustics Company, Inc., New York, N.Y.
(Booth 54)

Lederle Laboratories, Pearl River, N.Y.
(Booth 45)
J. B. Lippincott Company, Philadelphia, Pa.
(Booth 39)
Lloyd Brothers, Inc., Cincinnati, Ohio
(Booth 23)
Maico Electronics, Inc., Minneapolis, Minn.
(Booth 59)
McNeil Laboratories, Inc., Philadelphia, Pa.
(Booth 52)
Mead Johnson & Company, Evansville, Ind.
(Booth 13)
Merck Sharp & Dohme, Div. of Merck & Co., Inc., Philadelphia, Pa.
(Booths 6 & 7)
Micro X-ray Recorder, Inc., Chicago, Ill.
(Booth 2)
Parke, Davis & Company, Detroit, Mich.
(Booth 3)
Pfizer Laboratories, Brooklyn, N.Y.
(Booth 48)
Picker X-ray Corporation, Washington, D.C.
(Booth 51)
The Purdue Frederick Company, New York, N.Y.
(Booth 25)
Reed & Carnrick, Kenilworth, N.J.
(Booth 57)
R. J. Reynolds Tobacco Company, Winston-Salem, N.C.
(Booth 9)
Ritter Company, Inc., Rochester, N.Y.
(Booth 5)
A. H. Robins Company, Inc., Richmond, Va.
(Booth 16)
Roche Laboratories, Div. of Hoffmann- La-Roche, Inc., Nutley, N.J.
(Booths 14 & 34)
Rodana Research Corporation, Bethesda, Md.
(Booth 11)
J. B. Roerig and Company, New York, N.Y.
(Booth 26)
Sandoz Pharmaceuticals, Hanover, N.J.
(Booth 27)
Schering Corporation, Bloomfield, N.J.
(Booth 36)
G. D. Searle & Co., Chicago, Ill.
(Booth 61)
Smith Kline & French Laboratories, Philadelphia, Pa.
(Booth 60)
Stephenson Corporation, Red Bank, N.J.
(Booth 62)
Stock & Spanier, Inc., New York, N.Y.
(Booth 8)
Tailby-Nason Co., Inc., New York, N.Y.
(Booth 24)
U. S. Catheter & Instrument Corp., Glens Falls, N.Y.
(Booth 33)
The Upjohn Company, Kalamazoo, Mich.
(Booth 38)
Wallace Laboratories, New Brunswick, N.J.
(Booth 47)
Warner-Chilcott Laboratories, Morris Plains, N.J.
(Booth 29)
Westwood Pharmaceuticals, Buffalo, N.Y.
(Booth 10)
Winthrop Laboratories, New York, N.Y.
(Booth 28)
Wyeth Laboratories, Philadelphia, Pa.
(Booth 42)

MEDICAL FILM PROGRAM

Medical Films will be shown throughout the convention.
Films to be shown will be announced later.

COMMITTEES FOR THE 66TH ANNUAL CONVENTION

General Chairman

COL. AUBREY L. JENNINGS, USAF, MC

Assistant to General Chairman

COL. ARCHIE HOFFMAN, USAF, MC
F. J. SCHAFFER, M.D. (VA)

Scientific Program

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CAPT. ROMULUS L. MAY, MC, USN
REBER MILLER VAN MATRE, M.D. (VA)
COL. FRANK H. VAN WAGONER, MC, USA
DR. C. J. WAGNER (USPHS)

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MR. L. PAUL FLORY (VA)
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MR. STEVEN K. HERLITZ—*Chairman*

Registration and Reception
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LT. COL. CARRIE E. BARRETT, ANC, USA
COMDR. BURDETTE BLASKA, NC, USN
MAJOR PAULA CROWE, USAF, NC
MISS MARGARET MEAGHER (VA)

Dinners and Luncheons
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LT. COL. HARRIETT S. LEE, AMSC, USA
MISS FLORENCE S. LINDUFF (VA)
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LT. COL. WILLIAM J. CLEGG, USA, MSC
CAPT. JOHN B. COLLINS, USA, MSC
LT. COL. WILLIAM K. DOUGLAS, USAF, MC
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BRIG. GEN. JAMES A. MCCALLAM, USA, Ret.

Nominating
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MRS. H. H. TWITCHELL—*Honorary Chairman*
MRS. GEORGE B. GREEN—*General Chairman*

Hospitality Room (Mayflower Hotel)
MRS. THEODORE J. BAUER, *Chairman*
MRS. ARTHUR S. OSBORNE
MRS. J. K. SHAFER
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MRS. F. O. KREUZ
MRS. JAMES T. MCGIBONEY
MRS. CLARENCE P. CANBY
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Transportation (Chartered Busses)
MRS. ROBERT E. BITNER, *Chairman*
MRS. BINGHAM BOYCE
MRS. GEORGE M. BEAM
MRS. JAMES NUTTALL
MRS. JOHN DOMINICK
MRS. GEORGE ARCHAMBAULT
MRS. MALCOLM HOPE
MRS. BENJAMIN MILLER
MRS. JAMES SMITH

Luncheon and Fashion Show
MRS. AUBREY L. JENNINGS, *Chairman*
MRS. OTIS L. ANDERSON
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LADIES' ACTIVITIES

Time out for refreshments during a recent meeting of the Ladies' Activities committee, planning for the distaff side of the 66th Annual Convention of the Association of Military Surgeons. The meeting was held at the home of Mrs. George B. Green, wife of Colonel Green, U. S. Air Force Medical Corps, Arlington, Virginia.

(L. to R.) Mrs. Walter R. Tkach, *Tours;* Mrs. Frank Van Wagoner, *Registration;* Mrs. Robert O. Canada, *Tours;* Mrs. Aubrey L. Jennings, *Ladies' Luncheon;* (seated) Mrs. Robert E. Bitner, *Transportation;* Mrs. Theodore J. Bauer, *Hospitality;* Mrs. F. J. Schaffer, *Favors;* Mrs. George B. Green, *General Chairman of Ladies' Activities.*

BOOK REVIEWS

THE PSYCHIATRIC AIDE. A textbook of Patient Care. 2nd Ed. By Alice M. Robinson, R.N., M.S., Vermont State Hospital. 200 pp. J. B. Lippincott Company, Philadelphia and Montreal. Price $3.50.

This text displays a comprehensive appreciation of the importance of a good aide to the mentally ill patient. It approaches the care of psychiatric patients through the understanding, skills and attitudes of the aides themselves and empathy with them is established from the beginning.

All basic information needed by the aides relative to psychiatric nursing is briefly but adequately presented in a manner that stimulates their interest and pride in patient-care. Emphasis is placed on patients as individuals with varying needs to be met by the aides in helping them get well. The discussion of electro-therapy from this point of view is one of the best I have seen on this particular procedure.

The aides are briefly introduced to some of the newer trends such as the open door policy, the dynamics of both verbal and non-verbal communications, and the use of tranquilizing drugs.

This book is of interest to the veteran as well as the beginning aide, and is a valuable teaching tool wherever psychiatric aides are found.

MAJOR SELMA M. BRAWNER, ANC

ORTHOPAEDIC NURSING. 3rd Ed. By Mary Powell, S.R.N. 464 pp., illustrated. The Williams & Wilkins Co., Baltimore, exclusive U. S. agents. Price $6.50.

"Orthopaedic Nursing" by Mary Powell was written in England so one must expect word choices and methods to differ from ours, but the basic orthopedics does not differ. This is a very well written book by experienced hands in the field of orthopedic nursing and can contribute a great deal to the knowledge of the proper management of orthopedic patients, both children and adults. Treatments for the various diseases and injuries discussed are mentioned and the reader must remember that the surgeon in charge of the cases under his or her care may select another method of treatment for reasons not within the scope of the nursing text.

The art of plaster cast techniques and the use of splints and appliances is also covered. This is an excellent text and gives fine coverage to a specialized field of nursing care of ever increasing importance in this high speed mechanical age.

JOHN F. EGAN, M.D.

THE PLASMA PROTEINS. Their Clinical Significance. By Paul G. Weil, M.D., Ph.D., McGill University. 133 pp. J. B. Lippincott Company, Philadelphia and Montreal. Price $3.50.

This monograph was written for the purpose of bringing together in one volume a comprehensive review of the present day knowledge of the plasma proteins. The author has succeeded admirably in integrating the material from the older literature with the more recent advances in this field. He also presents the subject with emphasis on the clinical significance of the plasma proteins which include both normal and abnormal proteins in health and in diseased states.

This treatise is easily read, is concise, up-to-date, and is considered a good review of the subject. The statement that a simple slide test for routine use in the detection of rheumatoid arthritis was probably not meant to be the undisputable proof of this disease since false-positive results are obtained. A bibliography is adequate but not comprehensive. The book is recommended for the internist or clinician who would like to have a general review of this subject.

COL. D. O. LYNN, MC, USA

CARDIOVASCULAR SOUND IN HEALTH AND DISEASE. By Victor A. McKusick, M.D., Associate Professor of Medicine, The Johns Hopkins University School of Medicine. 570 pages, illustrated. The Williams & Wilkins Company, Baltimore. Price $15.00.

This monograph is a scholarly presentation of cardiovascular sounds which is comprehensive in scope and exhaustive in content. The first section deals with a detailed and critical historical review of the subject and not only includes factual information but also many humorous and interesting incidents. The nature of sound, the auditory mechanism, the art of auscultation and phonocardiography are discussed in separate chapters before the physiological and pathological aspects related to the production of heart sounds and murmurs are taken up.

The author introduces a different method for graphically recording cardiovascular sounds than the conventional phonocardiogram which he terms spectral phonocardiograms. This differs from the conventional oscillographic method, mainly in the fact that the frequency spectrum is displayed rather than the intensity. This may prove to be a com-

plimentary system to conventional phonocardiography or perhaps more valuable in certain instances, but it is not likely to replace phonocardiography as a teaching tool. The spectral phonocardiogram appears to demonstrate more effectively certain diastolic murmurs than the conventional type, but experience will be necessary to evaluate other possible advantages.

The different diseased states are treated separately in chapters on valvular heart disease, congenital heart disease and diseases of the pericardium and myocardium. The author also discusses cardiovascular sounds in animals, respiratory sounds and miscellaneous sounds of medical interest. There is an excellent bibliography containing over 1600 references. The numerous illustrations, graphs, and pictures of specimens and x-rays are well reproduced.

This book can best be recommended as a reference for the study of both the mechanics of production and the frequency sound characteristics as they are related to the cardiovascular system.

COL. D. O. LYNN, MC, USN

VIRAL AND RICKETTSIAL INFECTIONS OF MAN. 3rd Ed. Edited by Thomas M. Rivers, M.D., and Frank L. Horsfall, Jr., M.D., 44 contributors. 967 pages, 134 illustrations. J. B. Lippincott Company, Philadelphia and Montreal. Price $8.50.

This 3rd Edition has been completely rewritten. It contains fourteen new contributors and seven more chapters than the 2nd Edition. This was due to the rapid growth of knowledge in the field of rickettsial and viral infections since the previous addition was published. Examples of this are the two new chapters devoted to the ECHO virus and adenoviruses, both groups having been discovered within the past six years. Illustrations are abundant and excellent, especially the electron micrographs.

All outdated references have been replaced by current ones.

Approximately eleven years has passed since this publication first appeared, it is felt that this 3rd Edition has maintained the high standards for providing comprehensive information to students, teachers and the profession. It deserves to retain their confidence as a reference.

The credit side of the ledger outweighs the debit side, but for the reviewer to be completely honest, the debit side must be dealt with.

The Chapter dealing with Rabies does not mention the use of Duck-Embryo vaccine.

LT. COL. V. HARRY ADROUNIE, USAF (MSC)

CANCER OF THE PROSTRATE. By Raymond Darget, Professor of Clinical Urology, Faculty of Medicine of Bordeaux. 164 pages, illustrated. Masson et Cie, Paris. 2.500 fr.

This book presents a very excellent and comprehensive review of the treatment of cancer of the prostate by radium therapy in preference to radioisotopes. The following topics are fully discussed: diagnosis, standard methods of treatment, search for metastases, anatomy of prostate and adjacent structures, hormones—indication for use and their effect on breasts, testes, adrenals, and hypophysis.

The last third of the book deals with the use of radium, gives five methods of application including two apparently new ones: one consists of a plastic device which is hollowed out to hold the metallic radium and is inserted into the rectum; the other is inserted through a cystostomy opening in the form of a Y to lie within the urethra and on the prostate. The results of treatment are compared and those obtained by the use of metallic radium appear to be quite impressive. Factors to be considered in making a prognosis are summarized.

This is an excellent book and regrettably will have a limited audience in this country since it is written in French.

ALAN L. KLEIN, M.D. USPHS

EMERGENCY SURGERY. 7th Ed. By Hamilton Bailey, F.R.C.S., F.A.C.S., F.R.S.E., London. 1197 pages, 1576 figs. The Williams & Wilkins Company, Baltimore, exclusive U. S. agents. Price $32.50.

"A true surgeon is never fearless. He fears for his patients, he fears for his shortcomings, his own mistakes, but he never fears for himself or his professional reputation." (Samuel J. Mixter).

This volume of 1197 pages very specifically presents the subject of emergency surgery in such an exhaustive well organized and selective manner as to instill to a high degree the missing gaps of knowledge of the intermittent surgeon or general practitioner confronted with an emergency and thus to allay his fears for his patient or his own shortcomings.

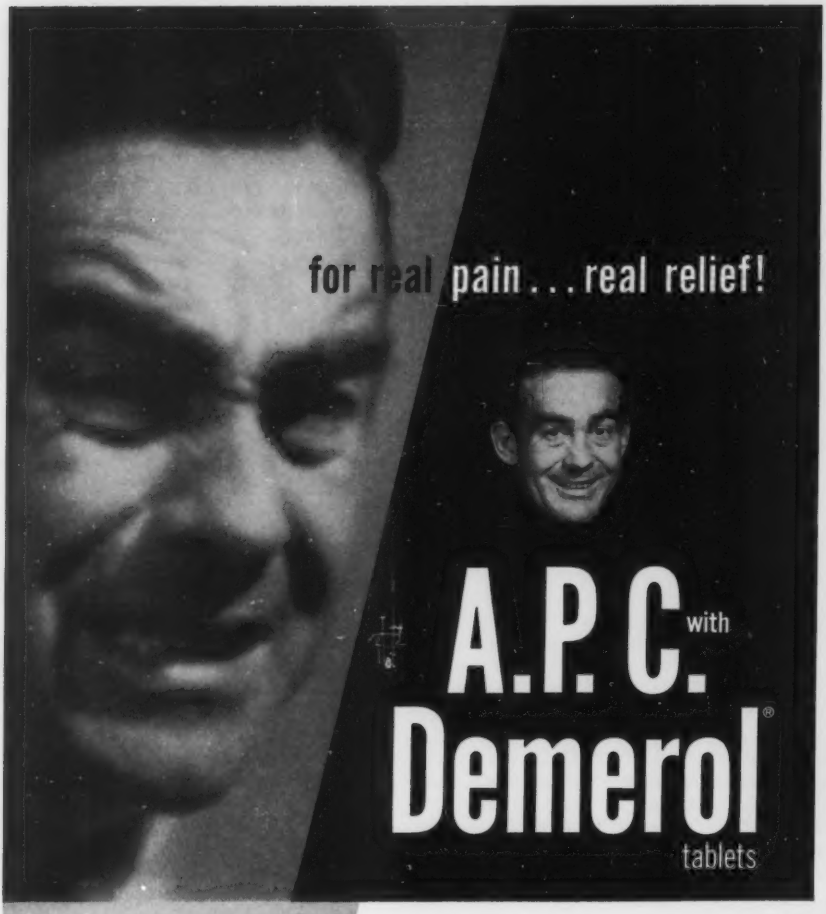
The contents deals with general emergency measures including burns, shock, electrolyte balance, cardiac arrest, air embolism; the abdomen and gastro-intestinal system, genito-urinary, thorax, extremities, eye-ear-nose and throat and even tropical emergencies.

The illustrations are superb, many in color to illustrate stages of pathologic processes and the black and white wash half tone cuts are clear, concise, with depth, and always illustrating a pertinent point or procedure in "how to do it" manner.

The format is orderly and many appropriate case histories are included.

The book is highly recommended, notwithstanding the price, and it would constitute a working companion for interns, residents and especially for the junior surgeon who so often is confronted with an emergency at night.

CAPT. R. M. MUGRAGE, MC, USN



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